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UNITED STATES GEOLOGICAL SURVEY

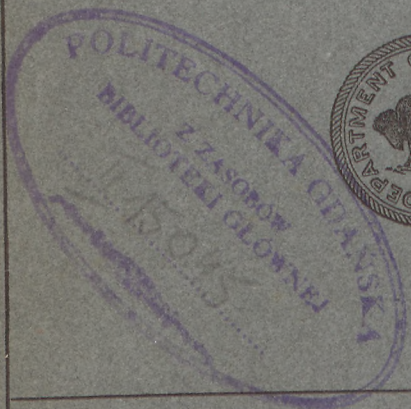
GEORGE OTIS SMITH, Director

BULLETIN 731

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OF
NORTH AMERICAN GEOLOGY
FOR
1919-1920

BY

JOHN M. NICKLES

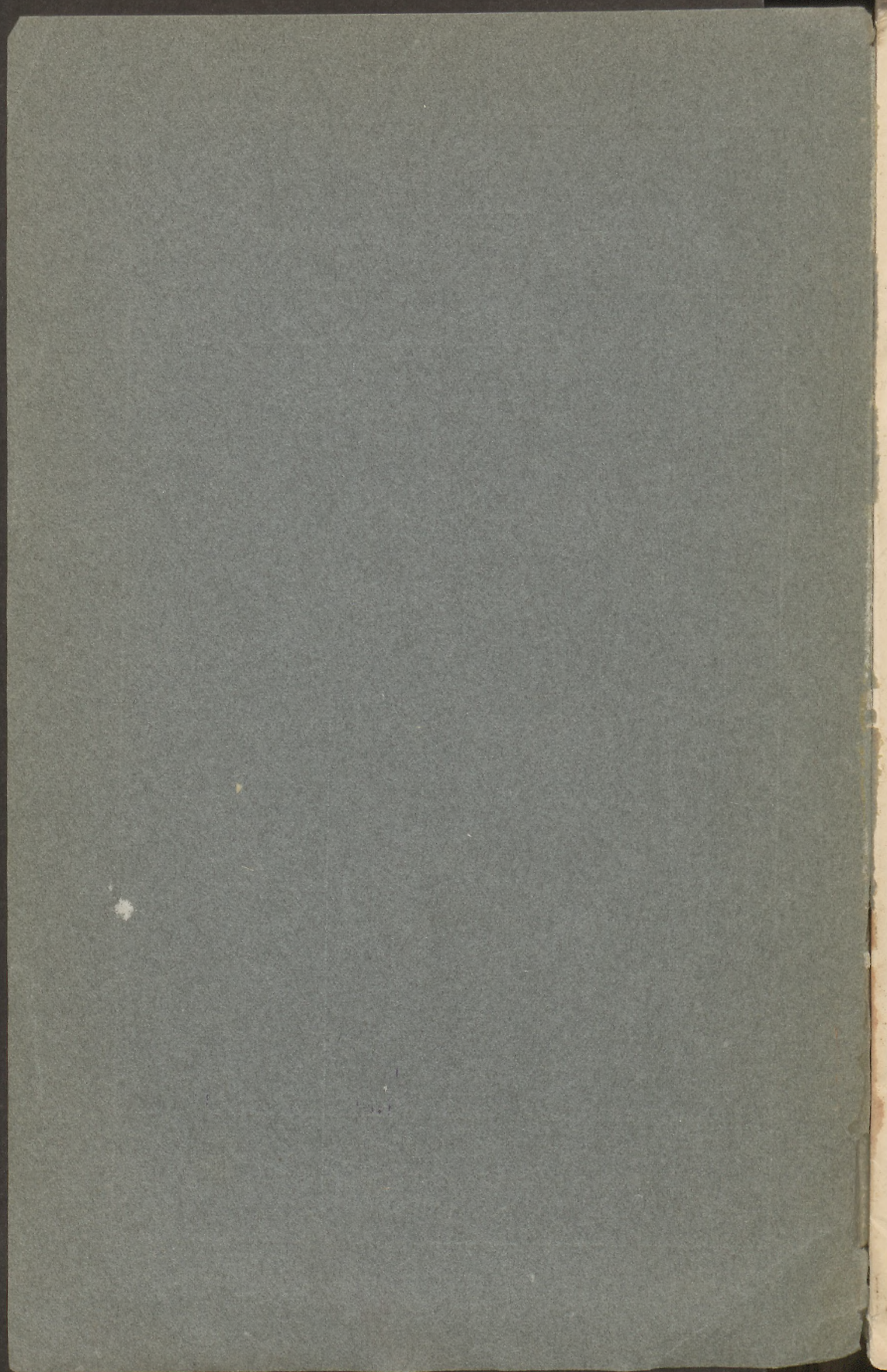


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OF

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CONTENTS.

	Page.
Introduction	1
Serials examined	3
Bibliography	9
Index	147
Lists	241
Chemical analyses	241
Mineral analyses	242
Minerals described	242
Rocks described	244
Geologic formations described	244

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INTRODUCTION.

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SERIALS EXAMINED

- Academy of Natural Sciences of Philadelphia: Proceedings, vol. 70, pt. 3; vol. 71; vol. 72. Philadelphia, Pa.
- Academy of Science of St. Louis: Transactions, vol. 23, nos. 7-9. St. Louis, Mo.
- Alabama Geological Survey: Bulletin nos. 21-23. Montgomery, Ala.
- American Academy of Arts and Sciences: Proceedings, vol. 54, nos. 5, 6; vol. 55, nos. 1-10. Boston, Mass.
- American Association of Petroleum Geologists: Bulletin, vols. 3, 4, 5, nos. 1, 2.
- American Institute of Mining Engineers: Bulletin, nos. 145-156; Transactions, vols. 60-64. New York.
- American Journal of Science, 4th ser., vols. 47-50. New Haven, Conn.
- American Mineralogist, vols. 4, 5. Philadelphia, Pa.
- American Museum of Natural History: Bulletin, vols. 38-43; Memoirs, new ser., vol. 3, pt. 2. New York.
- American Naturalist, vols. 53, 54. New York.
- American Philosophical Society: Proceedings, vols. 58, 59; Transactions, new ser., vol. 22, pt. 4. Philadelphia, Pa.
- Annals and Magazine of Natural History, 9th ser., vols. 3, 4. London.
- Appalachia, vol. 14, no. 4; vol. 15, no. 1. Boston, Mass.
- Arizona State Bureau of Mines: Bulletin, nos. 94, 98-99, 104-106. Tucson, Ariz.
- Bernice Pauahi Bishop Museum: Memoirs, vol. 5, pts. 2, 3; vol. 6, no. 1; Occasional Papers, vol. 7, nos. 1-9. Honolulu, Hawaiian Islands.
- Boston Society of Natural History: Proceedings, vol. 35, nos. 5, 6. Boston, Mass.
- Botanical Gazette, vols. 67-70. Chicago, Ill.
- British Columbia, Bureau of Mines: Annual Report of the Minister of Mines for 1918, 1919. Victoria, B. C.
- Buffalo Society of Natural Science: Bulletin, vols. 12, 13, no. 1. Buffalo, N. Y.
- Bulletins of American Paleontology, vol. 6, no. 31, vol. 8, no. 33. Ithaca, N. Y.
- California Academy of Sciences: Proceedings, 4th ser., vol. 2, nos. 14-17; vol. 9, nos. 1-15; vol. 10, nos. 1-9. San Francisco, Calif.
- California State Mining Bureau: Bulletin, nos. 85-88; Preliminary report, nos. 6, 7. San Francisco, Calif.
- California, University of, Department of Geology: Bulletin, vol. 12, nos. 1, 2, 4, 6. Seismographic Stations; Bulletin, nos. 15-19. Berkeley, Calif.
- Canada, Department of Mines, Mines Branch: Summary Report for 1918, 1919; Bulletin, nos. 27-32. Ottawa, Ont.
- Canada, Geological Survey: Memoirs, nos. 104, 106-121; Summary Report for 1917, pt. A; 1918, pts. A-G; 1919, pts. B, C, E-G. Ottawa, Ont.
- Canadian Field Naturalist, vol. 33, nos. 1-6, vol. 34, nos. 1-9. Ottawa, Ont.
- Canadian Mining Institute: Monthly Bulletin, nos. 81-104; Transactions, vols. 21, 22. Ottawa, Ont.
- Canadian Mining Journal, vols. 40, 41. Toronto and Montreal, Canada.
- Carnegie Institution of Washington: Yearbook nos. 17, 18, for 1918, 1919. Washington, D. C.

- Carnegie Museum: Annals, vol. 12, nos. 2-4, vol. 13, nos. 1, 2; Memoirs, vol. 7, no. 6, vol. 8, nos. 1, 2. Pittsburgh, Pa.
- Centralblatt für Mineralogie, etc., 1918-1920. Stuttgart, Germany.
- Coal Age, vols. 15-18. New York.
- Colorado Geological Survey: Bulletins 11, 15, 17-19, 23, 24. Denver, Colo.
- Colorado School of Mines: Magazine, vols. 9, 10; Quarterly, vols. 14, 15. Golden, Colo.
- Colorado Scientific Society: Proceedings, vol. 11, pp. 215-274. Denver, Colo.
- Connecticut Academy of Arts and Sciences: Transactions, vol. 23, pp. 1-416, vol. 24, pp. 1-243; Memoirs, vols. 6, 7. New Haven, Conn.
- Connecticut State Geological and Natural History Survey: Bulletin, nos. 28-32. Hartford, Conn.
- Cuba, Dirección de Montes y Minas; Boletín de Minas, nos. 5, 6. Habana, Cuba.
- Delaware County Institute of Science: Proceedings, vol. 8, no. 4, vol. 9, no. 1. Media, Pa.
- Denison University, Scientific Laboratories: Bulletin, vol. 19, pp. 1-224. Granville, Ohio.
- Deutsche geologische Gesellschaft: Zeitschrift, Bd. 67-72. Berlin, Germany.
- Economic Geology, vols. 14, 15. Lancaster, Pa.
- Elisha Mitchell Scientific Society: Journal, vol. 34, no. 4; vols. 35, 36. Chapel Hill, N. C.
- Engineering and Mining Journal, vols. 107-110. New York.
- Engineers' Club of Philadelphia: Proceedings, vols. 36, 37. Philadelphia, Pa.
- Engineers' Club of St. Louis: Journal, vols. 4, 5. St. Louis, Mo.
- Engineers' Society of Western Pennsylvania: Proceedings, vols. 35, 36. Pittsburgh, Pa.
- Florida State Geological Survey: Twelfth Annual Report. Tallahassee, Fla.
- Franklin Institute: Journal, vols. 187-190. Philadelphia, Pa.
- Geographical Journal, vols. 53-56. London.
- Geographical Review, vols. 7-10. New York.
- Geographical Society of Philadelphia: Bulletin, vols. 17, 18. Philadelphia, Pa.
- Geological Magazine, new ser., decade 6, vol. 6; vol. 57. London.
- Geological Society of America: Bulletin, vol. 29, no. 4; vols. 30, 31. New York.
- Geological Society of London: Quarterly Journal, vol. 73, pt. 4, vols. 74, 75, 76, pts. 1, 2. London.
- Geologists' Association of London: Proceedings, vols. 28-31. London.
- Georgia Geological Survey: Bulletin, nos. 35, 36. Atlanta, Ga.
- Harvard College, Museum of Comparative Zoology: Bulletin, vol. 62, nos. 10-15, vol. 63, nos. 1-9, vol. 64, nos. 1-7; Memoirs, vol. 39, nos. 3, 4, vol. 47, nos. 1, 2, vol. 48. Cambridge, Mass.
- Hawaiian Volcano Observatory: Monthly Bulletin, vols. 7, 8. Honolulu, Hawaii.
- Idaho, Bureau of Mines and Geology: First Annual Report; Bulletin, nos. 1-3. Moscow, Idaho.
- Illinois Academy of Science: Transactions, vols. 9, 10. Springfield, Ill.
- Illinois State Geological Survey: Bulletin, nos. 34, 36, 40, 41. Springfield, Ill.
- Indiana Academy of Science: Proceedings for 1918, 1919. Indianapolis, Ind.
- Indiana, Department of Conservation, Division of Geology: Publications, nos. 6, 8; First Annual Report. Indianapolis, Ind.
- Institution of Mining and Metallurgy: Bulletin, nos. 172-195. London.
- Institution of Mining Engineers: Transactions, vol. 56, pts. 4, 5, vols. 57-59, 60 pts. 1-4. Newcastle upon Tyne, England.

- Institution of Petroleum Technologists: Journal, vols. 4-6, nos. 14-24. London.
- Iowa Academy of Sciences: Proceedings, vols. 25, 26. Des Moines, Iowa.
- Japan, Imperial Earthquake Investigation Committee: Bulletin, vol. 7, no. 3, vol. 8, nos. 4, 5, vol. 9, no. 1. Tokyo, Japan.
- Journal of Geography, vols. 18, 19. Madison, Wis.
- Journal of Geology, vols. 27, 28. Chicago, Ill.
- Kansas State Geological Survey; Bulletin 5, 6 pts. 1, 2, 5, 6. Lawrence, Kans.
- Kansas, University, Science Bulletin, vol. 11, vol. 12, nos. 1, 2. Lawrence, Kans.
- Kentucky Geological Survey: 4th ser., vol. 3, pt. 3, vol. 4; 5th ser., vol. 1, nos. 1-3; Bulletins 1-4; 6th ser., vol. 1. Frankfort, Ky.
- Maryland Geological Survey: Cambrian and Ordovician. Baltimore, Md.
- Mazama, vol. 5, no. 4, vol. 6, no. 1. Portland, Oreg.
- Mexico, Instituto Geológico: Anales, nos. 6-9; Boletín, no. 18. Mexico City, D. F.
- Michigan Academy of Science: Report, 20th, 21st. Lansing, Mich.
- Michigan Geological and Biological Survey; Publications 26-28. Lansing, Mich.
- Mineral Foote-Notes, vol. 3, nos. 1-5. Philadelphia, Pa.
- Mining and Metallurgical Society of America: Bulletin, vols. 12, 13 (nos. 128-143). New York.
- Mining and Metallurgy (American Institute of Mining and Metallurgical Engineers), nos. 157-168. New York.
- Mining and Scientific Press, vols. 118-121. San Francisco, Calif.
- Mining Congress Journal, vols. 5, 6. Washington, D. C.
- Mining Magazine, vols. 20-23. London.
- Minnesota Geological Survey: Bulletins, nos. 14, 16, 17. Minneapolis, Minn.
- Mississippi State Geological Survey: Bulletin, nos. 14-16. Jackson, Miss.
- Missouri Bureau of Geology and Mines: 2d ser., vol. 15; Biennial Report [1917-18]. Jefferson City, Mo.
- National Academy of Sciences: Proceedings, vols. 5, 6; Memoirs, vol. 14, mem. 2, 4. Washington, D. C.
- National Geographic Magazine, vols. 35-38. Washington, D. C.
- Natural History; the Journal of the American Museum, vols. 19, 20. New York.
- Nature, vols. 102-104. London.
- Nautilus, vol. 32, nos. 3-4; vols. 33, 34, nos. 1, 2. Philadelphia, Pa.
- Neues Jahrbuch für Mineralogie, etc., 1917-1920. Stuttgart, Germany.
- New Jersey Geological Survey: Bulletin 19. Trenton, N. J.
- New Mexico, State School of Mines: Bulletin, nos. 2, 3. Socorro, N. Mex.
- New York Academy of Sciences: Annals, vol. 28, pp. 51-200, vol. 29, pp. 1-139. New York.
- New York State Museum: Bulletin, nos. 203-220. Albany, N. Y.
- North Carolina Geological and Economic Survey: Biennial Report, 1917-18; Economic Paper, no. 49. Raleigh, N. C.
- North Dakota Geological Survey: Bulletin no. 1. Grand Forks, N. Dak.
- Nova Scotia Institute of Science: Proceedings and Transactions, vol. 14, pt. 4. Halifax, Nova Scotia.
- Ohio Academy of Science: Proceedings, vol. 7, pts. 3, 4. Columbus, Ohio.
- Ohio Geological Survey: Fourth series, Bulletin, nos. 21, 22. Columbus, Ohio.
- Ohio Journal of Science, vol. 19, nos. 3-8, vols. 20, 21, nos. 1, 2. Columbus, Ohio.
- Ontario Bureau of Mines: Report, vol. 27, pt. 3, vols. 28, 29; Bulletin no. 39. Toronto, Ont.

- Oregon Bureau of Mines and Geology: Mineral Resources of Oregon, vol. 3, no. 1. Corvallis, Oreg.
- Ottawa Naturalist, vol. 32, nos. 7-9. Ottawa, Ont.
- Paleontographica Americana, vol. 1, no. 2. Ithaca, N. Y.
- Palaeontologische Zeitschrift, Bd. 2, 3. Berlin, Germany.
- Pennsylvania, Topographic and Geological Survey: Report no. 12; Miscellaneous Papers, no. 1. Harrisburg, Pa.
- Portland Society of Natural History: Proceedings, vol. 3, pt. 2. Portland, Me.
- Quebec, Mines Branch: Report on mining operations, 1918, 1919. Quebec, Canada.
- Rochester Academy of Science: Proceedings, vol. 5, pp. 241-288, vol. 6, pp. 1-55. Rochester, N. Y.
- Royal Society of Canada: Proceedings and Transactions, Third series, vols. 12, 13. Ottawa, Ont.
- Science, new ser., vols. 49-52. New York.
- Scientific Monthly, vols. 8-11. New York.
- Scientific Society of San Antonio: Annual Report, 15th, 16th. San Antonio, Tex.
- Seismological Society of America: Bulletin, vols. 9, 10. Stanford University, Calif.
- Sierra Club Bulletin, vol. 10, no. 4. vol. 11, no. 1. San Francisco, Calif.
- Smithsonian Institution: Smithsonian Miscellaneous Collections, vol. 67, nos. 5, 6, vol. 69, nos. 9-12, vols. 70, 71, 72, nos. 1-7, 9. Washington, D. C.
- Sociedad científica "Antonio Alzate," Mem. y Rev., t. 35, nos. 1-4, t. 37, nos. 2-6, t. 38, nos. 3-10. Mexico City, D. F.
- Société de Géographie de Québec: Bulletin, vols 13, 14. Quebec, Canada.
- South Dakota Geological Survey: Report of the State Geologist, 1918-1920; Circular, nos. 4, 6, 7. Vermillion, S. Dak.
- South Dakota School of Mines: Bulletin no. 13. Rapid City, S. Dak.
- Southern California Academy of Sciences: Bulletin vols. 18, 19. Los Angeles, Calif.
- Tennessee State Geological Survey: Resources of Tennessee, vol. 9, nos. 1, 2; Bulletin nos. 21-24. Nashville, Tenn.
- Texas, University of: Bulletin, 1814, 1815, 1817, 1818, 1819, 1821, 1822, 1839, 1840, 1847, 1849, 1852, 1856, 1857, 1931, 1932, 1945. Austin, Tex.
- Toronto, University, Studies: Geological Series, nos. 10, 11. Toronto, Ont.
- Torrey Botanical Club: Bulletin, vols. 46, 47. Lancaster, Pa.
- Torreya, vols. 19, 20, Lancaster, Pa.
- Tufts College Studies, vol. 4, nos. 7, 8, vol 5. no. 1. Tufts College, Mass.
- United States Bureau of Mines: Bulletin, nos. 78, 95, 112, 117, 144, 150, 162, 165, 168, 169, 172-185, 191, 196; Technical Papers, nos. 178, 203, 207, 209-215, 217-226, 227, 229-234, 236-245, 247, 250, 252, 253, 256, 257, 259, 264, 266, 267, 271. Washington, D. C.
- United States Geological Survey: Annual Report, 40th, 41st; Professional Papers 107, 109, 111-113, 115-120, 125; Bulletins 664-666, 669, 678, 682, 683, 686-688, 690-703, 705, 710-713; Water-Supply Papers 425, 429, 436, 439, 440, 442-444, 446, 448, 451-458, 461, 464, 467, 470-472, 474, 485, 491; Mineral Resources, 1917, 1918 (parts). Washington, D. C.
- United States National Museum: Bulletins 100 (parts), 104, 106, 108-111; Proceedings, vols. 54-58. Washington, D. C.
- Utah Academy of Sciences: Transactions, vol. 1. Salt Lake City, Utah.
- Vermont Geological Survey: Report of the State Geologist for 1917-18. Burlington, Vt.

- Virginia Geological Survey: Administrative report, 1918-19; Bulletins, nos. 17, 19. Charlottesville, Va.
- Wagner Free Institute of Science: Transactions, vol. 9, pt. 1. Philadelphia, Pa.
- Washington Academy of Sciences: Journal, vols. 9, 10. Washington, D. C.
- Washington Geological Survey: Bulletin, nos. 19, 20, 22. Olympia, Wash.
- Western Society of Engineers: Journal, vols. 24, 25. Chicago, Ill.
- West Virginia Geological Survey: County Reports, Fayette County, Webster County. Morgantown, W. Va.
- Wisconsin Academy of Science, Arts, and Letters: Transactions, vol. 19, pts. 1, 2. Madison, Wis.
- Wisconsin Geological and Natural History Survey: Eleventh and Twelfth Biennial Reports; Bulletin, nos. 52-A, 52-D, 56-A, 57. Madison, Wis.
- Zeitschrift für Gletscherkunde, Bd. 10, H. 4-5, Bd. 11, H. 1-2. Berlin, Germany.
- Zeitschrift für praktische Geologie, Jg. 23-28. Berlin, Germany.
- Zeitschrift für Vulkanologie, Bd. 5, 6 H. 1, 2. Berlin, Germany.

Year, vol. 10, no. 17, pp. 489-490, October 16, 1920.

Adams, Everett Allen.

1. A monograph on the development of the jaw muscles in recent and fossil vertebrates. New York Acad. Sci., Annals, vol. 23, pp. 51-103, 37 pls., 2 figs., January 15, 1919.

Adams, Sidney F.

1. A replacement of woods by dolomite: Jour. Geology, vol. 28, no. 4, pp. 535-565, 4 figs., May-June, 1920.
2. A microscopic study of vein quartz: Econ. Geology, vol. 15, no. 8, pp. 623-664, 8 pls., December, 1920.

Askins, W. S.

1. The Waco and Payson formations of the Texas Comanchean: Texas Univ. Bull., no. 1836, pp. 1-172, 13 pls., 17 figs., October 5, 1918 (1921).
2. (and Winona, W. M.). Paleontological correlation of the Fredericksburg and Washita formations in north Texas: Texas Univ. Bull., no. 1915, 124 pp., 22 pls., 6 figs., August 10, 1919 (pub. January, 1920).
3. (and Winona, W. M.). The geology of Tarrant County: Texas Univ. Bull., no. 1951, 125 pp., 6 pls., 8 figs., 2 maps, 1920.

Arguilar, Angel.

1. El petróleo en nuestras costas del Pacifico: Boletín Minero, L. V, nos. 3-4, pp. 273-275, March-April, 1919.

Agallier, Jack O.

1. The Kenosha earthquake of 1897: Seismol. Soc. America, Bull., vol. 10, no. 1, pp. 31-44, March, 1920.

Alcock, Frederick J.

10. The Head-Wabigoon map area, northern Manitoba, Canada: Geol. Survey, Mem. 110, 67 pp., 6 pls., 2 maps, 1920.
11. Red-Ely Inter area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1919, pt. 1, pp. 3-8, 1919.
12. Red-Ely Inter area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1919, pt. 1, pp. 9-10, 1920.
13. Cross-Phosphate map area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1919, pt. 1, pp. 11-12, 1920.

BIBLIOGRAPHY.

Adams, Elliot Q.

- (with Wherry, Edgar T.). The classification of mimetic crystals: Washington Acad. Sci., Jour., vol. 9, no. 6, pp. 153-157, March 19, 1919.

Adams, H. H.

1. Geological structure of Eastland and Stephens counties, Texas: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 2, pp. 159-167, map, 1920.

Adams, L. H.

2. The nature of the interior of the earth (abstract): Washington Acad. Sci., Jour., vol. 10, no. 17, pp. 498-499, October 19, 1920.

Adams, Leverett Allen.

3. A memoir on the phylogeny of the jaw muscles in recent and fossil vertebrates: New York Acad. Sci., Annals, vol. 28, pp. 51-166, 13 pls., 5 figs., January 15, 1919.

Adams, Sidney F.

4. A replacement of wood by dolomite: Jour. Geology, vol. 28, no. 4, pp. 356-365, 4 figs., May-June, 1920.
5. A microscopic study of vein quartz: Econ. Geology, vol. 15, no. 8, pp. 623-664, 8 pls., December, 1920.

Adkins, W. S.

6. The Weno and Pawpaw formations of the Texas Comanchean: Texas, Univ., Bull. no. 1856, pp. 1-172, 13 figs., 11 pls., October 5, 1918 [1920].
7. (and Winton, W. M.). Paleontological correlation of the Fredericksburg and Washita formations in north Texas: Texas, Univ., Bull. no. 1945, 128 pp., 22 pls., 6 figs., August 10, 1919 [pub. January, 1920].
(with Winton, W. M.). The geology of Tarrant County: Texas, Univ., Bull. no. 1931, 123 pp., 6 pls., 6 figs., 2 maps, 1920.

Aguilar, Ángel.

8. El petróleo en nuestras costas del Pacífico: Boletín Minero, t. 7, nos. 3-4, pp. 272-275, March-April, 1919.

Aguilera, José G.

9. The Sonora earthquake of 1887: Seismol. Soc. America, Bull., vol. 10, no. 1, pp. 31-44, March, 1920.

Alcock, Frederick J.

10. The Reed-Wekusko map area, northern Manitoba: Canada, Geol. Survey, Mem. 119, 47 pp., 6 pls., 2 maps, 1920.
11. Reed-File lakes area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1918, pt. D, pp. 6-8, 1919.
12. Wekusko Lake area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1918, pt. D, pp. 9-10, 1920.
13. Cross-Pipestone map area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1919, pt. D, pp. 11-18, 1920.

Alcock, Frederick J.—Continued.

14. The Athabaska series: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 25-32, July, 1920.

15. The origin of Lake Athabaska: *Geog. Rev.*, vol. 10, no. 6, pp. 400-407, 8 figs., December, 1920.

Alden, William C.

(with Salisbury, Rollin D.). The geography of Chicago and its environs (revised edition): *Geog. Soc. Chicago, Bull.* no. 1, 63 pp., 29 figs., 2 pls., May, 1920.

See also Winchester, no. 2018.

Alderson, Victor Clifton.

16. The oil shale industry. 175 pp., 15 pls., New York, Frederick A. Stokes Company, 1920.

17. The oil shale industry: *Colorado School of Mines, Quar.*, vol. 14, no. 4, pp. 3-15, October, 1919.

Aldrich, H. R.

18. The dip needle in stratigraphy: *Mining and Metallurgy*, no. 163, p. 33, July, 1920 (abstract); *Am. Inst. Min. and Met. Eng., Trans.* [preprint no. 998], 7 pp., 4 figs., 1920; [preprint] no. 1088, p. 12, August, 1921; discussion, no. 1038, pp. 18-24, 5 figs., January, 1921.

Aldrich, T. H.

(with Gardner, Julia A.). Mollusca from the upper Miocene of South Carolina with descriptions of new species. *Acad. Nat. Sci. Philadelphia, Proc.*, vol. 71, pt. 1, pp. 17-53, 4 pls., 1919.

Allan, John A.

19. First annual report on the mineral resources of Alberta. 103 pp., Edmonton, 1920.

20. Geology of the Swan Hills in Lesser Slave Lake district, Alberta: Canada, *Geol. Survey, Summ. Rept.*, 1918, pt. C, pp. 7-13, 1919.

Allen, H. C.

21. (and Lyder, E. E.). A chemical survey of the natural gases of Kansas and Oklahoma: *Kansas, Univ., Bull.*, vol. 19, no. 1, *Engineering Bull.* no. 11, Division of State Chemical Research, *Bull.* no. 3, 101 pp., 10 figs., 1919.

Allen, Milton A.

22. (and Butler, G. M.). Barytes: Arizona, Univ., *Bur. Mines, Bull.* no. 99, 18 pp., 1919.

23. The southern section of the Amole mining district: Arizona, Univ., *Bull.* no. 106 (geol. ser. no. 2), pp. 19-25, 4 figs., May, 1920.

Allen, R. C.

24. Mineral resources of Michigan with statistical tables of production and value of mineral products for 1917 and prior years: *Michigan Geol. and Biol. Survey, Pub.* 27 (Geol. ser. 22), 225 pp., 2 pls. (incl. map), 1918; . . . for 1918 . . . : *Pub.* 29 (Geol. ser. 24), 214 pp., 4 figs., 1920.

25. Correlation of formations of Huronian group in Michigan: *Am. Inst. Min. and Met. Eng., Bull.* no. 135, pp. 2579-2594, 1 fig., September, 1919; *Trans.*, vol. 63, pp. 188-212, 1 fig., 1920. Discussion by W. O. Hotchkiss, E. F. Burchard, Carl Zapffe, and E. C. Harder, *Mining and Metallurgy*, no. 157, sec. 12, pp. 1-6, January, 1920.

Alling, Harold L.

26. Geology of the Lake Clear region (parts of St. Regis and Saranac quadrangles): New York State Mus. Bull., nos. 207, 208 (March-April, 1918), pp. 111-145, 10 pls., 3 figs., 2 maps, 1919.
27. Pleistocene geology [of the Lake Placid quadrangle]: New York State Mus. Bull. nos. 211, 212, pp. 71-95, 8 pls., 7 figs., map, 1919.
28. Some problems of the Adirondack pre-Cambrian: Am. Jour. Sci., 4th ser., vol. 48, pp. 47-68, 3 figs., July, 1919. Abstract, Geol. Soc. America, Bull., vol. 30, p. 155, March 31, 1919.

Ambrose, A. W.

29. Analysis of oil-field water problems: Mining and Metallurgy, no. 165, pp. 23-24, 1 fig., September, 1920 (abstract); Am. Inst. Min. and Metal. Eng., Trans. [preprint] no. 1019, 23 pp., 1920; discussion by R. A. Conkling, E. DeGolyer, and R. V. A. Mills, no. 1038, pp. 68-71, January, 1921.

Anderson, Carl B.

30. The artesian waters of northeastern Illinois: Illinois State Geol. Survey, Bull. no. 34, 326 pp., 4 pls. (incl. maps), 3 figs., 1919.

Andrews, E. C.

31. Grove Karl Gilbert: Sierra Club Bull., vol. 11, no. 1, pp. 60-68, January, 1920.

Andros, Stephen O.

32. The petroleum handbook. 206 pp., 48 figs., Chicago, The Shaw Publishing Company, 1919.

Anrep, A.

33. Peat investigations [New Brunswick]: Canada, Geol. Survey, Summ. Rept., 1918, pt. F, pp. 31-32, 1919.
34. Investigations of certain peat bogs in Ontario and Quebec: Canada, Geol. Survey, Summ. Rept., 1919, pt. E, pp. 44-45, 1920.

Arey, Melvin F.

35. Geology of Ringgold County: Iowa Geol. Survey, vol. 27, pp. 33-64, 6 figs., map [1920].
36. Geology of Taylor County: Iowa Geol. Survey, vol. 27, pp. 65-103, 11 figs., map [1920].

Armstrong, L. K.

37. Geology of Chewelah district [Washington]. In Northwest Mines Handbook, vol. 1, pp. 149-150, published by Sidney Norman, Spokane, Washington, 1918.

Arnold, Ralph.

38. The recent earthquakes at Los Angeles, California: Science, new ser., vol. 52, pp. 121-122, August 6, 1920.
39. Oil geology in relation to valuation: Geol. Soc. America, Bull., vol. 31, no. 4, pp. 433-440, November 30, 1920.

Ashley, George H.

40. The Abram Creek-Stony River coal field, northeastern West Virginia: U. S. Geol. Survey, Bull. 711, pp. 85-103, 2 pls. (incl. map), February 13, 1920. Abstract by J. D. Sears, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 521, November 4, 1920.

Ashley, George H.—Continued.

41. A use classification of coal: *Am. Inst. Min. and Met. Eng., Bull.* no. 152, pp. 1129-1141, August, 1919; (with discussion), *Trans.*, vol. 63, pp. 782-796, 1920; *Coal Age*, vol. 16, pp. 918-925, 4 figs., December 25, 1919.
 42. Sulphur in coal, geological aspects: *Am. Inst. Min. and Met. Eng., Bull.* no. 153, pp. 2073-2079, September, 1919; *Trans.*, vol. 63, pp. 732-738, 1920; *Discussion, Mining and Metallurgy*, no. 157, p. 60, January, 1920.
 43. How the "grand push" determined present character of Pennsylvania coals: *Coal Age*, vol. 17, no. 26, pp. 1307-1310, 2 figs. (maps), June 24, 1920.
 44. Discussion of an article by Ellis Lovejoy, entitled "Notes on fire clays of the northern Appalachian coal basin": *Am. Ceramic Soc., Jour.*, vol. 2, no. 10, pp. 790-793, October, 1919.
 45. Memorial of Albert Homer Purdue: *Indiana Acad. Sci., Proc.* 1918, pp. 247-257, port., 1919.
- See also Johnson, nos. 939, 940; Winchester, no. 2018.

Atwood, Wallace W.

46. The country around Camp Devens. [Text on back of topographic map], Massachusetts, Camp Devens and vicinity, U. S. Geol. Survey, 1919.
47. Relation of landslides and glacial deposits to reservoir sites in the San Juan Mountains, Colorado (U. S. Geol. Survey, *Bull.* 685, 1918) (abstract by R. W. Stone): *Washington Acad. Sci., Jour.*, vol. 9, no. 11, p. 316, June 4, 1919.

Aurand, Harry A.

48. Fluorspar deposits of Colorado: *Colorado Geol. Survey, Bull.* 18, 94 pp., 1 pl., 10 figs., 1920.
49. Mineral deposits of the western slope: *Colorado Geol. Survey, Bull.* 22, 78 pp., 2 maps [1920].

Aurin, F. L.

50. Pre-Pennsylvanian oil and gas horizons in Kay County, Oklahoma: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 2, pp. 173-181, 1920.

Bagg, Rufus Mather.

51. The Foraminifera of the Bonaventure cherts of Gaspé: *New York State Mus. Bull.* nos. 219, 220, pp. 149-204, 6 pls., 1920.

Bailey, L. W.

52. (and Mathew, G. F.). Some problems of New Brunswick geology: *Roy. Soc. Canada, Trans.*, 3d ser., vol. 12, sec. 4, pp. 105-130, 1919.
53. The paleogeography of Acadia: *Roy. Soc. Canada, Proc. and Trans.*, 3d ser., vol. 13, sec. 4, pp. 1-16, 1920.

Bailey, Vernon.

54. Rock rivers: *Natural History*, vol. 20, no. 2, pp. 169-172, 5 figs., March-April, 1920.

Baker, Charles Laurence.

55. Contributions to the stratigraphy of eastern New Mexico: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 99-126, February, 1920.
(with Udden, J. A., and Böse, Emil). Review of the geology of Texas, 3d ed., revised 1919: *Texas, Univ., Bull.* 1916, no. 44, 178 pp., 12 figs., map [1919].

Baker, Frank Collins.

56. The life of the Pleistocene or Glacial Period: Illinois, Univ., Bull., vol. 17, no. 41, 476 pp., 57 pls., 3 figs., 1920.
57. Pleistocene Mollusca from Indiana and Ohio: Jour. Geology, vol. 28, no. 5, pp. 439-457, July-August, 1920.
58. A new form of *Amnicola* from the Ohio Pleistocene deposits with notes on a *Physa* from the same formation: Nautilus, vol. 33, no. 4, pp. 125-127, April, 1920.
59. Animal life in loess deposits near Alton, Illinois, with descriptions of two new varieties of land shells from the same deposits: Nautilus, vol. 34, no. 2, pp. 61-66, October, 1920.

Ball, Sydney H.

60. (and Broderick, T. M.). Magmatic iron ore in Arizona: Eng. and Min. Jour., vol. 107, pp. 353-354, 2 figs., February 22, 1919.
 61. Diamonds: Eng. and Min. Jour., vol. 109, pp. 1202-1208, 5 figs., May 29, 1920.
- See also Wheeler, no. 1950.

Ballard, S. M.

62. The Boise Basin district in Idaho: Eng. and Min. Jour., vol. 109, pp. 881-882, 1 fig., April 10, 1920.

Ballou, W. H.

63. A question of identity; were flying reptiles merely unfeathered birds, or birds merely feathered reptiles?: Sci. Am., vol. 120, no. 22, pp. 570-571, 3 figs., May 31, 1919.

Bancroft, George J.

64. The genesis of quartz in veins: Min. and Sci. Press, vol. 119, pp. 447-448, September 27, 1919.

Bancroft, M. F.

65. Lardeau map area, British Columbia: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 62-63, 1919.
66. Slocan map area, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 39-48, 1920.

Barbour, Erwin Hinckley.

67. A preliminary report on the alkali resources of Nebraska: Nebraska Geol. Survey, vol. 4, pt. 28, pp. 405-438, 21 figs. [1916].

Bardwell, Carlos.

68. (and others). Chemical properties of Utah hydrocarbons: Utah Acad. Sci., Trans., vol. 1, pp. 78-95, February, 1918.

Barrell, Joseph.

69. Grove Karl Gilbert; an appreciation: Sierra Club Bull., vol. 10, no. 4, pp. 397-399, January, 1919.
70. Sources and tendencies in American geology: Sci. Monthly, vol. 8 no. 3, pp. 193-206, March, 1919. Abstract, Geol. Soc. America. Bull., vol. 30, p. 77, March 31, 1919.
71. The place of modern languages in research, particularly geological research: Sci. Monthly, vol. 8, no. 6, pp. 481-495, June, 1919.
72. The nature and bearings of isostasy: Am. Jour. Sci., 4th ser., vol. 48, pp. 281-290, October, 1919.
73. The status of the theory of isostasy: Am. Jour. Sci., 4th ser., vol. 48, pp. 291-338, 5 figs., October, 1919.

Barrell, Joseph—Continued.

74. (Edited by H. H. Robinson). The Piedmont terraces of the northern Appalachians: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 227-258, 327-362, 407-428, 18 figs., 2 pls., April-June, 1920.

Barrett, Edward.

75. Forty-first annual report of department of geology and natural resources. Indiana. 123 pp., 15 pls., 11 figs., 7 maps, Fort Wayne, Ind., 1917.
76. The dunes of northwestern Indiana: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 11-27, 9 pls., 1917.
77. The beautiful Shades: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 80-89, 11 figs., 1917.
78. The canyon of McCormick's Creek: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 90-99, 8 pls., 1917.
79. Structural geology [of oil and gas fields]: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 100-112, map, 1917.
80. Report of department of geology and natural resources. Indiana, Year Book 1917: pp. 234-241, 1918.
81. Report of the department of geology and natural resources (forty-third annual report): Indiana, Year Book 1918, pp. 195-255, 1919.
82. (and Dove, Leonard P.). Workable coal seams of Indiana; pyrite in the coals of Indiana: Indiana, Year Book 1918, pp. 219-238, 1919.
(with Bennett, L. F.). The flints and cherts of Indiana. Indiana, Year Book 1918, pp. 212-219, 1919.

Barrett, N. O.

83. Mineral resources in Illinois in 1916: Illinois State Geol. Survey, Bull. no. 36, pp. 19-70, 5 figs., 1920.
84. Petroleum in Illinois in 1917 and 1918: Illinois State Geol. Survey, Bull. no. 40, pp. 9-20, 1919.

Barton, Donald C.

85. The Palangana salt dome, Duval County, Texas: *Econ. Geology*, vol. 15, no. 6, pp. 497-510, 3 figs., September, 1920.

Bascom, Florence.

86. (and Miller, B. L.). Description of the Elkton and Wilmington quadrangles. Maryland-Delaware-New Jersey-Pennsylvania: U. S. Geol. Survey, Geol. Atlas, Elkton-Wilmington folio (no. 211), 22 pp., 4 maps, 1920.
87. The physiography of Mount Desert [Island]: *Geog. Soc. Philadelphia, Bull.*, vol. 17, no. 4, pp. 117-130, 4 pls., map, October, 1919.
88. The use of the two-circle contact goniometer in teaching crystallography: *Am. Mineralogist*, vol. 5, no. 3, pp. 45-50, 1 fig., March, 1920.

Bassler, Harvey.

89. A sporangiophoric lepidophyte from the Carboniferous [*Cantheliorhus*]: *Bot. Gazette*, vol. 68, no. 2, pp. 73-108, 3 pls., August, 1919.
(with Swartz, Charles K.). Typical section of the Allegheny formation (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 153-154, March 31, 1919.
(with Swartz, C. K., and Price, W. A.). Coal measures of Maryland: *Geol. Soc. America, Bull.*, vol. 30, no. 4, pp. 567-596, 2 pls., 1 fig., December 31, 1919; abstract, no. 1, p. 154, March 31, 1919.

Bassler, R. S.

90. Cambrian and Ordovician: Maryland Geol. Survey, 424 pp., 58 pls. (incl. map), 27 figs. (mainly paleogeographic maps), 1919.
91. Proceedings of the tenth annual meeting of the Paleontological Society, held at Baltimore, Maryland, December 28, 1918: Geol. Soc. America, Bull., vol. 30, pp. 143-164, March 31, 1919.
92. Proceedings of the eleventh annual meeting of the Paleontological Society, held at Boston, Massachusetts, December 30-31, 1919: Geol. Soc. America, Bull., vol. 31, pp. 197-232, March 31, 1920.
(with Canu, Ferdinand). Fossil Bryozoa from the West Indies: Carnegie Inst. Washington, Pub. no. 291, pp. 73-102, 7 pls., 1919.
(with Canu, Ferdinand). North American early Tertiary Bryozoa: U. S. Nat. Museum, Bull. 106, 879 pp., 162 pls., 279 figs., 1920.

See also Stose, no. 1747.

Bastin, Edson S.

93. (and Laney, F. B.). The genesis of the ores at Tonopah, Nevada (U. S. Geol. Survey, Prof. Paper 104, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 317-318, June 4, 1919.
94. Antimony in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 653-663, 1 fig., 1 pl., May 13, 1919.
95. (and McCaskey, H. D.). The work on mineral resources done by the United States Geological Survey: Min. and Sci. Press, vol. 121, pp. 166-168, July 31, 1920.

See also Bliss, no. 154.

Bateman, Alan M.

96. Military and geologic mapping—a plane-table: Geol. Soc. America, Bull., vol. 30, pp. 405-414, 5 figs., September 30, 1919.
97. Why ore is where it is: Econ. Geology, vol. 14, no. 8, pp. 640-642, December, 1919.
98. (and McLaughlin, D. H.). Geology of the ore deposits of Kennecott, Alaska: Econ. Geology, vol. 15, no. 1, pp. 1-80, 6 pls., 12 figs., January-February, 1920.
99. Geology of the ore deposits of Kennecott, Alaska (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 157-158, March 31, 1920.

See also Wheeler, no 1950.

Bates, Mowry.

100. A concrete example of the use of well logs [Red River-Crichton oil field, Louisiana]: Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 590-597, 3 figs., 1920.

See also Semmes, no. 1657.

Bather, Francis Arthur.

101. A mystery crinoid; on *Mysticocrinus*, a new genus of Silurian Crinoidea, by Frank Springer: Geol. Mag., new ser., dec. 6, vol. 6, pp. 182-183, April, 1919.
102. The antiquity of parasitic disease; on the parasitism of Carboniferous crinoids: Geol. Mag., new ser., dec. 6, vol. 6, pp. 276-277, June, 1919.
103. Fossils and life; the differentia of paleontology: Science, new ser., vol. 52, pp. 257-264, September 17, 1920.

Bayley, W. S.

104. Kaolin in North Carolina, with a brief note on hydromica: *Econ. Geology*, vol. 15, no. 3, pp. 236-246, April-May, 1920.

Beach, L. M.

105. Feldspar in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 2, pp. 945-949, June 28, 1920.

Beal, Carl H.

106. The classification of undeveloped oil land for purposes of valuation: *Econ. Geology*, vol. 15, no. 4, pp. 315-327, 1 fig., June, 1920; *Inst. Petroleum Technologists, Jour.*, vol. 6, no. 23, pp. 297-306, July, 1920.

Beals, Colonzo C.

107. Soil survey of Cass County: *Indiana Acad. Sci., Proc.* 1918, pp. 186-204, map, 1919.
(with Erni, C. P.). Soil survey of Carroll County: *Indiana, Dept. Geology and Nat. Res.*, 41st Ann. Rept., pp. 45-66, map, 1917.

Beede, J. W.

108. Notes on the structures and oil showings in the red beds of Coke County, Texas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 117-123, 1919.
109. Further notes on the structure near Robert Lee, Coke County, Texas: *Texas, Univ., Bull.*, no. 1847, pp. 3-7, 1 pl., August 20, 1918 [1920].
110. Notes on the geology and oil possibilities of the northern Diablo Plateau in Texas: *Texas, Univ., Bull.* no. 1852, 40 pp., 1 fig., 7 pls. (incl. map) [1920].
111. Correlation of the upper Paleozoic rocks of the Hueco Mountain region of Texas (abstract): *Science*, new ser., vol. 51, p. 494, May 14, 1920.

Beidelman, J. C.

112. The zinc and lead deposits of Gaspesia [Quebec]: *Canadian Min. Jour.*, vol. 41, pp. 102-105, February 6, 1920.

Bell, J. Mackintosh.

113. The nickel-copper mines of Sudbury: *Min. Mag.*, vol. 23, no. 2, pp. 87-94, 3 figs., August, 1920.
114. The Porcupine gold field, Ontario: *Min. Mag.*, vol. 23, no. 3, pp. 139-149, 7 figs., September, 1920.

Bell, Robert N.

115. Mineral resources of Idaho. In *Northwest Mines Handbook*, vol. 1, pp. 27-30, published by Sidney Norman, Spokane, Washington, 1918.
116. The I. X. L. copper prospect [Heath mining district, Adams County, Idaho]: *Eng. and Min. Jour.*, vol. 108, pp. 400-402, 4 figs., September 6, 1919.
117. Twentieth annual report of the mining industry of Idaho for the year 1918. 135 pp., illus. [1919].
118. Twenty-first annual report of the mining industry of Idaho for the year 1919. 181 pp., illus. [1920].

Bengzon, Ernesto.

119. Some notes and statistics on copper: *Colorado School of Mines Mag.*, vol. 9, no. 11, pp. 299-303, 1 fig., November, 1919.

Bennett, L. F.

- 120. Geology and the war: Indiana Acad. Sci., Proc., 1918, pp. 56-59, 1919.
- 121. (and Barrett, Edward). The flints and cherts of Indiana: Indiana, Year Book 1918, pp. 212-219, 1919.

Benson, W. N.

- 122. Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 144-148, March 31, 1920.

Berger, Walter R.

- 123. The extent and interpretation of the Hogshooter gas sand [Washington County, Oklahoma]: Am. Jour. Sci., 4th ser., vol. 48, pp. 189-194, 2 figs., September, 1919. Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 212-216, 1 fig., 1919 (with discussion).

Berkey, Charles P.

- 124. Introduction to the geology of Porto Rico: New York Acad. Sci., Scientific Survey of Porto Rico and the Virgin Islands, vol. 1, pt. 1, pp. 11-29, 1 pl. (map), 3 figs., 1919.
- 125. Engineering geology in and after the war (abstract, with discussion by O. E. Meinzer): Geol. Soc. America, Bull., vol. 30, p. 81, March 31, 1919.

Berry, Edward Wilber.

- 126. The history of the linden and ash: Plant World, vol. 21, no. 7, pp. 163-175, 9 figs., July, 1918.
- 127. Geologic history of the locust and its allies: Plant World, vol. 21, no. 11, pp. 284-298, 2 figs., November, 1918.
- 128. Paleogeographic significance of the Cenozoic floras of equatorial America and the adjacent regions: Geol. Soc. America, Bull., vol. 29, no. 4, pp. 631-636, December 30, 1918.
- 129. Upper Cretaceous floras of the eastern Gulf region in Tennessee, Mississippi, Alabama, and Georgia: U. S. Geol. Survey, Prof. Paper 112, 177 pp., 33 pls. (incl. map), 12 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 20, pp. 631-632, December 4, 1919.
- 130. A Cretaceous *Hymenaea* from Alabama: Am. Jour. Sci., 4th ser., vol. 47, pp. 65-68, 1 fig., January, 1919.
- 131. Pleistocene plants from Tennessee and Mississippi: Torreya, vol. 19, no. 1, pp. 8-10, January, 1919.
- 132. *Eucalyptus* never present in North America: Science, new ser., vol. 49, pp. 91-92, January 24, 1919.
- 133. The age of the Brandon lignite and flora: Am. Jour. Sci., 4th ser., vol. 47, pp. 211-216, March, 1919.
- 134. Present tendencies in paleontology: Am. Jour. Sci., 4th ser., vol. 48, pp. 1-12, July, 1919. Abstract, Washington Acad. Sci., Jour., vol. 9, no. 13, pp. 382-383, July 19, 1919.
- 135. The Upper Cretaceous Mississippi gulf: Scientific Monthly, vol. 9, no. 2, pp. 131-144, 6 figs., August, 1919.
- 136. An Eocene flora from trans-Pecos Texas: U. S. Geol. Survey, Prof. Paper 125, pp. 1-9, 3 pls., 2 figs., September 12, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 11, p. 328, June 4, 1920.

Berry, Edward Wilber—Continued.

137. The geological history of the sweet gum and witch hazel: *Plant World*, vol. 22, no. 12, pp. 345-354, 9 figs., December, 1919.
138. The evolution of flowering plants and warm-blooded animals: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 207-211, March, 1920.
139. The ancestors of the sequoias: *Natural History*, vol. 20, no. 2, pp. 153-155, 3 figs., March-April, 1920.
140. Fossil plants from the late Cretaceous of Tennessee: *Nat. Acad. Sci., Proc.*, vol. 6, no. 6, pp. 333-334, June 15, 1920.
141. The late Lower Cretaceous at Federal Hill, Maryland: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 48-52, 5 figs., July, 1920.
142. The teaching of paleobotany: *Geol. Soc. America, Bull.*, vol. 31, no. 3, pp. 389-392, September 30, 1920.
143. Contributions to the Mesozoic flora of the Atlantic Coastal Plain, XIII; North Carolina: *Torrey Bot. Club, Bull.*, vol. 47, no. 9, pp. 397-406, 2 figs., September, 1920.
144. Concerning diastrophism: *Science, new ser.*, vol. 52, pp. 315-318, October 1, 1920.
145. The age of the Dakota flora: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 387-390, November, 1920.
146. Paleontology and pragmatism: *Science, new ser.*, vol. 52, pp. 529-531, December 3, 1920.

Berry, Miss H. M.

- (with Pratt, Joseph Hyde). The mining industry in North Carolina during 1913-17, inclusive: *North Carolina Geol. and Econ. Survey, Econ. Paper no. 49*, 170 pp., 1 pl., 1919.

Berryman, B. A.

147. Outline of mining and smelting conditions at San Pedro, New Mexico: *Utah Acad. Sci., Trans.*, vol. 1, pp. 122-127, February, 1918.

Bichowsky, F. Russell.

148. An unusual sulphur crystal: *Washington Acad. Sci., Jour.*, vol. 9, no. 5, pp. 126-131, 2 figs., March 4, 1919.

Billingsley, Paul.

149. Some features of the application of geology to mining as practised by the geological department Anaconda Copper Mining Company [Butte, Montana]: *Canadian Min. Inst., Monthly Bull.* no. 97, pp. 431-435, May, 1920. *Min. and Sci. Press*, vol. 120, pp. 907-908, June 19, 1920.

(with Kemp, James F.). Sweet Grass Hills, Montana (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 158-159, March 31, 1920.

Black, George F.

150. Amber and its origin: *Am. Mineralogist*, vol. 4, nos. 7-10, pp. 83-85, 97-99, 118-120, 130-131, July-October, 1919.

Blackwelder, Eliot.

151. The climatic history of Alaska from a new viewpoint: *Illinois Acad. Sci., Trans.*, vol. 10, pp. 275-280 [1918].
152. The U. S. Geological Survey: *Science, new ser.*, vol. 51, pp. 346-348, April 2, 1920.
153. The origin of the central Kansas oil domes: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 1, pp. 89-94, 1920.

Bliss, Eleanora F.

154. Some problems of international readjustment of mineral supplies as indicated in recent foreign literature: *Econ. Geology*, vol. 14, no. 2, pp. 147-171, 5 figs., March-April, 1919. Abstract, with discussion by E. S. Bastin, *Geol. Soc. America, Bull.*, vol. 30, pp. 101-102, March 31, 1919.

Bloesch, Edward.

155. Unconformities in Oklahoma and their importance in petroleum geology: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 253-285, 1919.

Boalich, E. S.

156. (and others). The clay industry in California: *California State Min. Bur., Prel. Rept. no. 7*, 108 pp., 24 figs., January, 1920.

Böggild, O. B.

157. Grönland. In Steinmann, G., and Wilckens, O., *Handbuch der regionalen Geologie*, H. 21, Bd. IV, 2a, 38 pp., 6 figs. (incl. maps), Heidelberg, 1917.

158. Dahllit von Kangerdluarsuk [Grönland]: *Zeitschr. Krystallographie*, Bd. 55, H. 5-6, pp. 417-425, 5 figs., 1920.

159. Leifit, ein neues Mineral von Narsarsuk, Grönland: *Zeitschr. Krystallographie*, Bd. 55, H. 5-6, pp. 425-429, 1920.

Boericke, W. F.

160. (and Garnett, T. H.). The Wisconsin zinc district: *Am. Inst. Min. and Met. Eng., Bull.* no. 152, pp. 1213-1235, 5 figs., August, 1919; *Trans.*, vol. 63, pp. 213-243, 5 figs., 1920. Discussion by G. H. Cox and others, *Mining and Metallurgy*, no. 157, pp. 68-71, January, 1920.

Böse, Emil.

161. The Permo-Carboniferous ammonoids of the Glass Mountains, west Texas, and their stratigraphical significance: *Texas. Univ., Bull.* no. 1762, 241 pp., 11 pls., November 5, 1917.

162. On a new *Exogyra* from the Del Rio clay and some observations on the evolution of *Exogyra* in the Texas Cretaceous: *Texas. Univ., Bull.* no. 1902, 22 pp., 5 pls., 1 fig., January 5, 1919.

163. On the ammonoids from the Abo sandstone of New Mexico and the age of the beds which contain them: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 51-60, January, 1920.

164. On a new ammonite fauna of the Lower Turonian of Mexico: *Texas. Univ., Bull.* no. 1856, pp. 173-252, 7 figs., 9 pls., October 5, 1918 [1920].

(with Udden, J. A., and Baker, C. L.). Review of the geology of Texas, 3d ed., revised 1919: *Texas. Univ., Bull.* 1916, no. 44, 178 pp., 12 figs., map [1919].

Bond, Lewis A.

165. The registration of earthquakes at the Berkeley Station and at the Lick Observatory Station from October 1, 1919, to March 31, 1920: *California, Univ., Seismographic Stations, Bull.* no. 19, pp. 387-404, September 29, 1920.

Bonillas, Ignacio S.

166. Clásificación [de rocas del Estado de Guerrero]. *Bol. Minero*, t. 6, no. 4, pp. 498-504, October, 1918.

Bonnell, Clarence.

167. The variety of physiographic material in a few counties of southern Illinois: Illinois Acad. Sci., Trans., vol. 9, pp. 203-208, 3 pls. [1917].

Boot, David H.

168. Meteor Mountain [Arizona]: Iowa Acad. Sci., Proc., vol. 26, pp. 379-383, 6 figs. [1920].

Bosworth, Thomas Owen.

169. Geology of the Mid-Continent oil fields, Kansas, Oklahoma, and north Texas. xiv, 314 pp., 24 figs., 8 pls., map, New York, The Macmillan Company, 1920. Review by K. C. Heald, Econ. Geology, vol. 15, no. 7, pp. 612-617, November, 1920.

Boughton, Charles W.

170. Elk City gas field, Elk and Montgomery counties, Kansas: Kansas, State Geol. Survey, Bull. 5, 31 pp., 5 pls., 6 figs. [1920].

Bowen, C. F.

171. Gradations from continental to marine conditions of deposition in central Montana during the Eagle and Judith River epochs: U. S. Geol. Survey, Prof. Paper 125, pp. 11-21, 1 pl. (map), October 20, 1919.
172. (and Roundy, P. V., Ross, C. S., and Reeves, Frank). Structure and oil and gas resources of the Osage Reservation, Oklahoma: Tws. 21-23 N., Rs. 6-7 E., and Tws. 23-25 N., Rs. 3-5 E.: U. S. Geol. Survey, Bull. 686, pp. 279-301, 3 pls. (incl. maps), 1919.
173. Anticlines in a part of the Musselshell Valley (U. S. Geol. Survey, Bull. 691, pp. 185-209, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 15, p. 442, September 19, 1919.
- (with Heald, K. C., and others). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 24 N., R. 9 E.: U. S. Geol. Survey, Bull. 686, pp. 193-212, 2 pls. (incl. map), 3 figs., 1919.

Bowen, N. L.

174. Crystallization differentiation in igneous magmas: Jour. Geology, vol. 27, no. 6, pp. 393-430, 5 figs., September-October, 1919.
175. Abnormal birefringence of torbenite: Am. Jour. Sci., 4th ser., vol. 48, pp. 195-198, 2 figs., September, 1919.
176. Cacoclasite from Wakefield, Quebec: Am. Jour. Sci., 4th ser., vol. 48, pp. 440-442, December, 1919.
177. Echellite, a new mineral: Am. Mineralogist, vol. 5, no. 1, pp. 1-3, January, 1920.
178. Deformation of crystallizing magma: Jour. Geology, vol. 28, no. 3, pp. 265-267, April-May, 1920.
179. Differentiation by deformation: Nat. Acad. Sci., Proc., vol. 6 no. 4, pp. 159-162, April 15, 1920. Abstract, Geol. Soc. America, Bull., vol. 31, no. 1, p. 139, March 31, 1920.
180. Crystallization differentiation: Geol. Mag. vol. 57, pp. 238-239, May, 1920.
181. Optical properties of anthophyllite: Washington Acad. Sci., Jour., vol. 10, no. 14, pp. 411-414, 1 fig., August 19, 1920.

Bownocker, John A.

182. Geologic map of Ohio. [Ohio, Geol. Survey], 1920. Scale, 1 to 500,000.
183. Depletion of natural gas in the Appalachian field: Natural Gas Assoc. America. Proc. 14th Ann. Meeting, pp. 253-272, 8 figs., 1920.

Bownocker, John A.—Continued.

184. Rise and decline in production of petroleum in Ohio and Indiana: Mining and Metallurgy, no. 158, sec. 1, p. 34 (abstract), sec. 22, 12 pp., 2 figs., February, 1920; Discussion by L. S. Panyity, Am. Inst. Min. and Met. Eng. [Trans., preprint no. 988], pp. 14-16, 1920.
185. Our decreasing natural gas supply (abstract): Science, new ser., vol. 51, pp. 518-519, May 21, 1920.

Bradley, Walter W.

186. California mineral production for 1918, with county maps. California State Min. Bur., Bull. no. 86, 212 pp., illus., 1919.
187. California mineral production for 1919, with county maps: California State Min. Bur., Bull. no. 88, 204, pp., illus., 1920.

Branner, John C.

188. Incidents in the history of the geological survey of Arkansas, and some conclusions to be drawn therefrom. In Ferguson, Jim G., Outlines of Arkansas geology, pp. 15-20, Little Rock, 1920.
189. Road-making materials in Arkansas. In Ferguson, Jim G., Outlines of Arkansas geology, pp. 126-132, Little Rock, 1920.

Branson, E. B.

190. A geologic section from 40 miles west of St. Louis County to Jackson County, Missouri: Am. Jour. Sci., 4th ser., vol. 49, pp. 267-278, 1 fig., April, 1920.

Brantley, J. Edward.

191. Petroleum possibilities of Alabama; Part II, Coastal Plain area: Alabama, Geol. Survey, Bull. no. 22, pp. 121-220, 5 pls., 1 fig., 1920.

Bretz, J. Harlen.

192. The late Pleistocene submergence in the Columbia Valley of Oregon and Washington: Jour. Geology, vol. 27, no. 7, pp. 489-506, 2 figs., October-November, 1919.
193. The Juan de Fuca lobe of the Cordilleran ice sheet: Jour. Geology, vol. 28, no. 4, pp. 333-339, 1 fig., May-June, 1920.

Brewer, W. M.

194. Taseko Valley iron ore deposits: British Columbia, Minister of Mines, Ann. Rept. 1919, pp. 241-251, 1920.

Brigham, Albert Perry.

195. Cape Cod and the old colony: Geog. Rev., vol. 10, no. 1, pp. 1-22, 1 fig., July, 1920.

Brill, J. Bayard.

- (with Jones, Grove B.). Soil survey of Benton County, Indiana: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 28-44, map, 1917.

Broderick, T. M.

196. Some of the relations of magnetite and hematite: Econ. Geology, vol. 14, no. 5, pp. 353-366, 2 pls., 2 figs., August, 1919.
197. Detail stratigraphy of the Biwabik iron-bearing formation, east Mesabi district, Minnesota: Econ. Geology, vol. 14, no. 6, pp. 441-451, 2 pls., September-October, 1919.

Broderick, T. M.—Continued.

198. Economic geology and stratigraphy of the Gunflint iron district, Minnesota: *Econ. Geology*, vol. 15, no. 5, pp. 422-452, 2 figs., July-August, 1920.
(with Grout, Frank F.). The magnesite deposits of the eastern Mesabi range, Minnesota: *Minnesota Geol. Survey, Bull.* no. 17, 58 pp., 18 pls. (incl. maps), 9 figs., 1919.
(with Ball, Sydney H.). Magmatic iron ore in Arizona: *Eng. and Min. Jour.*, vol. 107, pp. 353-354, 2 figs., February 22, 1919.
(with Grout, Frank F.). Organic structures in the Biwabik iron-bearing formation of the Huronian in Minnesota: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 199-205, 4 figs., September, 1919.

Brodie, Walter M.

199. Coquina, the shell rock of Florida: *Min. and Sci. Press*, vol. 119, pp. 193-194, 2 figs., August 9, 1919.
200. Curious coal deposits in Missouri: *Coal Age*, vol. 16, pp. 876-881, 20 figs., December 11 and 18, 1919.

Brokaw, Albert D.

201. Interpretation of so-called paraffin dirt of Gulf coast oil fields (with discussion by W. E. Wrather, E. G. Woodruff, Lee Hager, W. G. Matteson, E. W. Shaw): *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 482-500, 1920.

Brooks, Alfred H.

202. The application of geology to war (abstract): *Washington Acad. Sci., Jour.*, vol. 10, no. 11, pp. 331-333, June 4, 1920.

Brown, Barnum.

203. (and O'Connell, Marjorie). Discovery of the Oxfordian in western Cuba (abstract): *Geol. Soc. America, Bull.*, vol. 30, p. 152, March 31, 1919.

Brown, C. W.

204. Field experiment in isostasy (abstract with discussion by W. M. Davis): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 114, March 31, 1920.
205. Postglacial river changes in Rhode Island and continental tilt (abstract with discussion by J. B. Woodworth): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 114-115, March 31, 1920.
See also Goldthwait, no. 668.

Browning, Iley B.

206. (and Russell, Philip G.). Coals and structure of Magoffin County, Kentucky: *Kentucky Geol. Survey, Fourth Series*, vol. 5, pt. 2, 552 pp., 2 maps, 1919.

Bruce, E. L.

207. Athapapuskow Lake district, Manitoba: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. D, pp. 1-2, 1919.
208. The district lying between Reed Lake and Elbow Lake, Manitoba: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. D, pp. 2-5, 1919.
209. Gold quartz veins and scheelite deposits in southeastern Manitoba: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. D, pp. 11-15, 1920.

Bruce, E. L.—Continued.

210. Knee Lake district, northeastern Manitoba: Canada, Geol. Survey, Summ. Rept., 1919, pt. D, pp. 1-11, 2 figs., 1920.

211. Chalcopyrite deposits in northern Manitoba: Econ. Geology, vol. 15, no. 5, pp. 386-397, 1 pl., 2 figs., July-August, 1920.

Bruhl, Paul T.

212. Gold in McDuffie County, Georgia: Eng. and Min. Jour., vol. 110, no. 6, p. 265, August 7, 1920.

Brumell, H. P. H.

213. Graphite in Quebec and Alabama; a comparison: Canadian Min. Inst., Bull. no. 88, pp. 858-860, August, 1919; Trans., vol. 22, pp. 378-405, 9 figs. [1920].

214. Graphite in Quebec, Canada: Eng. and Min. Jour., vol. 109, pp. 548-550, February 28, 1920.

Bryan, Kirk.

215. Origin of rock tanks and charcos: Am. Jour. Sci., 4th ser., vol. 50, pp. 186-206, 12 figs., September, 1920.

216. Classification of springs: Jour. Geology, vol. 27, no. 7, pp. 522-561, 23 figs., October-November, 1919.

217. Habits of thought of a geologist applied to military problems (abstract): Washington Acad. Sci., Jour., vol. 9, no. 15, pp. 452-453, September 19, 1919.

218. Geology and physiography of the Papago country, Arizona (abstract): Washington Acad. Sci., Jour., vol. 10, no. 2, pp. 52-53, January 19, 1920.

219. Mountain pediments; a discussion of the erosion of desert ranges (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 152, March 31, 1920.

Bryan, P. W.

220. Some geographical factors in the northern Appalachian coal field: Scottish Geog. Mag., vol. 36, no. 4, pp. 232-244, 4 figs., October 15, 1920.

Bryant, W. L.

221. On the structure of *Eusthenopteron*: Buffalo Soc. Nat. Sci., Bull., vol. 13, no. 1, pp. 1-59, 18 pls., 8 figs., 1919.

(with Hussakof, L.). Catalogue of the fossil fishes in the museum of the Buffalo Society of Natural Sciences: Buffalo Soc. Nat. Sci., Bull., vol. 12, 346 pp., 70 pls., 64 figs., 1918.

Bucher, Walter H.

222. On ripples and related sedimentary surface forms and their paleogeographic interpretation: Am. Jour. Sci., 4th ser., vol. 47, pp. 149-210, 241-269, 15 figs., March and April, 1919.

223. The mechanical interpretation of joints: Jour. Geology, vol. 28, no. 8, pp. 707-730, 9 figs., November-December, 1920. Abstract, Science, new ser., vol. 51, pp. 519-520, May 21, 1920.

Buddington, A. F.

224. Report on the pyrite and pyrrhotite veins in Jefferson and St. Lawrence counties, New York: New York State Defense Council, Bull. no. 1, 40 pp., 4 pls., November, 1917.

Buddington, A. F.—Continued.

- 225. Foliation of the gneissoid syenite-granite complex of Lewis County, New York: New York State Mus. Bull., nos. 207, 208 (March-April 1918), pp. 101-110, 6 pls. (incl. map), 1919.
- 226. Pre-Cambrian rocks of southeast Newfoundland: Jour. Geology, vol. 27, no. 6, pp. 449-479, 11 figs., September-October, 1919.
(with Ferguson, J. B.). The binary system åkermanite-gehlenite: Am. Jour. Sci., 4th ser., vol. 50, pp. 131-140, 4 figs., August, 1920.

Buehler, H. A.

- 227. Biennial report of the State geologist . . . [1917-18]: Missouri Bur. Geology and Mines, 117 pp., 4 pls., (incl. 3 maps), 1919. [Mineral resources, pp. 33-112.]

Burch, Albert.

- 228. (and Burchard, Ernest F.). Minerales de cromo y de manganeso en Cuba: Cuba, Dirección Montes y Minas, Bol. Minas no. 5, pp. 41-56, 1919.
- 229. (and Burchard, E. F.). Chrome and manganese ores in Cuba: Cuba, Dirección Montes y Minas, Bol. Minas no. 5, pp. 57-70, 1919.

Burchard, Ernest F.

- 230. Cement in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 343-380, 3 figs., February 4, 1919.
- 231. Iron ore, pig iron, and steel in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 557-603, 4 figs., April 28, 1919.
- 232. Fluorspar and cryolite in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 317-329, 2 figs., December 9, 1919.
- 233. Iron ore, pig iron, and steel in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 527-584, 5 figs., April 20, 1920.
- 234. Cement in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 565-589, 3 figs., April 9, 1920.
- 235. Chromite and chromiferous iron ore in Cuba: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 716-725, May 15, 1920.
- 236. Marble resources of southeastern Alaska; with a section on the geography and geology by Theodore Chapin: U. S. Geol. Survey, Bull. 682, 118 pp., 26 pls. (incl. maps), 6 figs., 1920.
- 237. Manganese ore deposits in Cuba: Am. Inst. Min. and Met. Eng., Trans., vol. 63, pp. 51-104, 26 figs. 1920; (abstract), Bull. no. 147, pp. 591-595, March, 1919.
- 238. Manganese ore deposits of Cuba (abstract): Washington Acad. Sci., Jour., vol. 9, no. 13, pp. 385-386, July 19, 1919.
- 239. Chrome-ore deposits in Cuba: Am. Inst. Min. and Met. Eng., Bull. no. 153, pp. 2523-2546, 7 figs., September, 1919; Trans., vol. 63, pp. 150-174, 8 figs., 1920. Discussion, Mining and Metallurgy, no. 157, p. 39, January, 1920.
(with Burch, Albert). Minerales de cromo y de manganeso en Cuba: Dirección Montes y Minas, Bol. Minas no. 5, pp. 41-56, 1919.
(with Burch, Albert). Chrome and manganese ores in Cuba, Dirección Montes y Minas, Bol. Minas no. 5, pp. 57-70, 1919.
See also Allen, R. C., no. 25.

Burckhardt, Carlos.

- 240. Faunas jurásicas de Symon (Zacatecas) y faunas cretácicas de Zumpango del Río (Guerrero): México, Inst. Geol., Bol. no. 33, t. 1, 135 pp., 1919, t. 2 (atlas), 30 pls., 1921.

Burroughs, Elizabeth Harding.

241. Bibliography of petroleum and allied substances in 1916: U. S. Bur. Mines, Bull. 165, 159 pp., 1919.

242. Bibliography of petroleum and allied substances, 1917: U. S. Bur. Mines, Bull. 180, 170 pp., 1920.

Burrows, A. G.

243. (and Knight, C. W.). Lightning River gold area and a remarkable series of lava flows [Ontario]: Canadian Min. Jour., vol. 40, pp. 83-86, February 12, 1919.

244. Matachewan gold area: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 3, pp. 53-64, 10 figs., 1920.

245. Gowganda silver area: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 3, pp. 77-88, 4 figs., map, 1920.

246. (and Hopkins, P. E.). Kirkland Lake gold area (second report): Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 4, 53 pp., illus., 2 maps, 1920.

(with Knight, C. W., and others). Abitibi-Night Hawk gold area, District of Timiskaming: Ontario Bur. Mines, 28th Ann. Rept., vol. 28, pt. 2, pp. 1-70, 50 figs., map, 1919.

Burton, Geo. E.

247. Design for logmeter: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 332-333, 1 fig., 1919.

Burwash, E. M.

248. A geological reconnaissance into Patricia, including part of sixth meridian line, and Wenasaga, Birch Lake, and Trout Lake rivers: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 1, pp. 157-192, 11 figs., 1920.

249. Geology of the Canadian Rockies: Canadian Alpine Jour., vol. 11, pp. 97-109, 2 pls., 1920.

250. Orogenic and physiographic history of the Rocky Mountain geosynclinal: Canadian Alpine Jour., vol. 11, pp. 110-120, 1 pl., 1920.

Burwell, Blair.

251. Carnotite mining in southwestern Colorado: Eng. and Min. Jour., vol. 110, no. 16, pp. 755-758, 7 figs., October 16, 1920.

Butler, B. S.

252. Relation of ore deposits to thrust faults in the central Wasatch region. Utah: Econ. Geology, vol. 14, no. 2, pp. 172-175, 1 pl., 1 fig., March-April, 1919.

253. Ore deposits of Utah: Eng. and Min. Jour., vol. 108, pp. 605-611, 641-645, 15 figs., October 11 and 18, 1919.

254. Primary (hypogene) sulphate minerals in ore deposits: Econ. Geology, vol. 14, no. 8, pp. 581-609, 2 figs., December, 1919.

255. (and Loughlin, G. F., and others). The ore deposits of Utah: U. S. Geol. Survey, Prof. Paper 111, 672 pp., 74 figs., 57 pls. (incl. maps), 1920.

256. Copper in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 723-796, 4 figs., 1 pl., March 13, 1920.

257. Copper in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 877-935, 3 figs., September 28, 1920.

(with Dunlop, J. P.). Silver, copper, lead, and zinc in the Central States in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 59-125, October 31, 1919.

Butler, G. M.

- (with Allen, M. A.). Barytes: Arizona, Univ., Bur. Mines, Bull. no. 99, 18 pp., 1919.

Butts, Charles.

258. Geology and oil possibilities of the northern part of Overton County, Tennessee, and of adjoining parts of Clay, Pickett, and Fentress counties: Tennessee, State Geol. Survey, Bull. 24 (Pt. 2-A, Ann. Rept. 1919), 45 pp., 3 pls. (incl. map), 4 figs., 1919.

259. Geology of Barren County, Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 147-177, 7 figs. map., October 1, 1919.

(with Weller, Stuart, and others). The geology of Hardin County and the adjoining part of Pope County: Illinois State Geol. Survey, Bull. no. 41, 416 pp., 30 figs., 11 pls., 1920.

Buwalda, John P.

260. Fault system at the southern end of the Sierra Nevada, California (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 127, March 31, 1920.

261. Oligocene Equidae in the Marsh collection (abstract): Geol. Soc. America, Bull., vol. 21, no. 1, p. 224, March 31, 1920.

Cable, E. J.

262. Relation of the Wisconsin drift to the Iowan drift as revealed in Worth County: Iowa Acad. Sci., Proc. 1918, vol. 25, pp. 539-544, 5 figs. [1919].

263. The Iowan-Wisconsin border: Iowa Acad. Sci., Proc., vol. 26, pp. 399-404, 3 figs. [1920].

264. The deep well at Laurens, Pocahontas County: Iowa Acad. Sci., Proc., vol. 26, p. 405 [1920].

Cady, Gilbert H.

265. Lateral erosion in the upper Illinois Valley by the Chicago outlet (abstract): Illinois Acad. Sci., Trans., vol. 9, p. 210 [1917].

266. The New Richmond sandstone of northern Illinois (abstract): Illinois Acad. Sci., Trans., vol. 9, p. 210 [1917].

267. Geology and mineral resources of the Hennepin and La Salle quadrangles: Illinois State Geol. Survey, Bull. no. 37, 136 pp., 6 pls. (incl. maps), 36 figs., 1919.

268. Coal resources of District V (Saline and Gallatin counties): Illinois State Geol. Survey, Cooperative Mining Series, Bull. 19, 135 pp., 9 pls. (incl. maps), 22 figs., 1919.

269. Valuable pyrite in Illinois coal beds: Coal Age vol. 16, pp. 136-140, 9 figs., July 24, 1919.

270. The structure of the La Salle anticline: Illinois State Geol. Survey, Bull. no. 36, pp. 85-179, 9 pls. (incl. maps), 9 figs., 1920.

271. Low-sulphur coal in Illinois: Am. Inst. Min. and Met. Eng., Bull. no. 151, pp. 1113-1115, 1 fig., July, 1919; Trans., vol. 63, pp. 641-648, 1 fig., 1920. Discussion, Mining and Metallurgy, no. 157, sec. 12, pp. 34-39, January, 1920.

Cahen, Edward.

272. Selenium: Mineral Foote-Notes, vol. 3, no. 5, pp. 5-16, September-October, 1919.

Calhoun, Fred H. H.

273. Memorial of Patrick Hues Mell: Geol. Soc. America, Bull., vol. 30, pp. 43-47, port., March 31, 1919.

Calkins, F. C. See Butler, 255.

Calman, W. T.

274. Dr. C. D. Walcott's researches on the appendages of trilobites: Geol. Mag., new ser., dec. 6, vol. 6, pp. 359-363, 1 fig., 1 pl., August, 1919.

Camacho, Heriberto.

275. Las aguas subterráneas en Tlanalapan, Dto. de Apan, E. de Hidalgo: Mexico, Inst. Geol., Anales no. 8, pp. 5-23, 3 pls. (incl. maps), 1920.

276. Informe acerca de las aguas subterráneas del Valle de Tecamachalco ó Valsequillo, Estado de Puebla: Mexico, Inst. Geol., Anales no. 8, pp. 25-38, 8 pls., 1920.

Camp, Samuel H.

- (with Richardson, Charles H.). The terranes of Northfield, Vermont: Vermont, State Geologist, 11th Rept., pp. 99-119, 6 pls. (incl. map) [1919].

Campbell, C. M.

277. The Granby mines at Phoenix [British Columbia]: Canadian Min. Inst., Trans., vol. 22, pp. 155-179, 13 figs. [1920].

Campbell, Donald G.

278. Palladium in Alaskan lode deposits: Min. and Sci. Press, vol. 119, pp. 520-522, 2 figs., October 11, 1919.

Campbell, E. E.

279. Mineral occurrences in the Stewart district [British Columbia]: Canadian Min. Inst., Monthly Bull. no. 95, pp. 220-224, March, 1920.

280. The Hidden Creek mine and its operations [Granby Bay, British Columbia]: Canadian Min. Inst., Trans., vol. 22, pp. 135-154, 12 figs. [1920].

Camsell, Charles.

281. (and Malcolm, Wyatt). The Mackenzie River basin: Canada, Geol. Survey, Mem. 108, 154 pp., 14 pls., 1 fig., map, 1919.

282. Mercury deposits of Kamloops Lake [British Columbia]: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 17-22, 1919.

283. Boring operations for oil in the vicinity of Vancouver, British Columbia: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 22-25, 1919.

284. Copper Mountain, Gun Creek [British Columbia]: Canada, Geol. Survey Summ. Rept., 1918, pt. B, pp. 25-28, map, 1919.

285. Platinum investigations in British Columbia: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 28-30, 1919.

286. Coquihalla map area, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 30-35, 1920.

287. Silver deposits at Stump Lake, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 35-36, 1920.

288. Geological features of the gold deposits of British Columbia: Canadian Min. Inst., Bull. no. 88, pp. 860-866, August, 1919.

Canu, Ferdinand.

- 289. (and Bassler, Ray S.). Fossil Bryozoa from the West Indies: Carnegie Inst. Washington, Pub. no. 291, pp. 73-102, 7 pls., 1919.
- 290. (and Bassler, Ray S.). North American early Tertiary Bryozoa: U. S. Nat. Mus., Bull. 106, 879 pp., 279 figs., 162 pls., 1920.

Capps, Stephen R.

- 291. The Kantishna region, Alaska: U. S. Geol. Survey, Bull. 687, 116 pp., 17 pls. (incl. maps), 6 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 15, pp. 439-440, September 19, 1919.
- 292. Gold lode mining in the Willow Creek district [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 177-186, 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 633, December 4, 1919.
- 293. Mineral resources of the western Talkeetna Mountains [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 187-205, 1 pl. (map), 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 633, December 4, 1919.
- 294. Mineral resources of the upper Chulitna region [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 207-232, 1 pl. (map), 1919. Abstract, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 633, December 4, 1919.

Carlson, Charles Gordon.

- 295. A test of the feldspar method for the determination of the origin of metamorphic rocks: Jour. Geology, vol. 28, no. 7, pp. 632-642, 1 fig., October-November, 1920.

Carpenter, Jay A.

- 296. The Divide district [near Tonopah, Nevada]: Eng. and Min. Jour., vol. 107, pp. 859-861, 1 fig., May 17, 1919.
- 297. The Kelly silver mine at Randsburg, California: Eng. and Min. Jour., vol. 108, pp. 940-943, 3 figs., December 27, 1919.

Case, E. C.

- 298. Permo-Carboniferous time versus Permo-Carboniferous conditions: Michigan Acad. Sci., 20th Ann. Rept., p. 82, 1918.
- 299. The environment of life in the late Paleozoic in North America; a paleogeographic study. Carnegie Inst. Washington, Pub. no. 283, 273 pp., 7 figs., paleogeographic map, 1919.
- 300. Study of the vertebrate fauna and paleogeography of North America in the Permian period, with especial reference to world relations: Carnegie Inst. Washington, Year Book no. 17, 1918, p. 310, February, 1919.
- 301. Notes on a specimen of *Stylomys nebrascensis* Leidy: Am. Jour. Sci., 4th ser., vol. 47, pp. 435-438, 5 figs., June, 1919.
- 302. On a very perfect thoracic shield of a large labyrinthodont in the geological collections of the University of Michigan: Michigan, Univ., Mus. Zool., Occ. Papers no. 82, 3 pp., 1 pl., April 28, 1920.
- 303. Preliminary description of a new suborder of phytosaurian reptiles with a description of a new species of *Phytosaurus*: Jour. Geology, vol. 28, no. 6, pp. 524-535, 6 figs., September-October, 1920.

Castello, W. O.

- 304. The commercial minerals of California, with notes on their uses, distribution, properties, ores, field tests, and preparation for the market: California State Min. Bur., Bull. no. 87, 124 pp., January, 1920.

Cathcart, S. H.

305. Mining in northwestern Alaska: U. S. Geol. Survey, Bull. 712, pp. 185-198, 5 figs., 1920.

Chadwick, George Halcott.

306. New species of coral [*Palaeophyllum*, Manitoulin Island]: Canada, Geol. Survey, Mem. 111, pp. 128-129, 1 fig. (on pl. 5), 1919.
307. A new eurypterid horizon (abstract): Geol. Soc. America, Bull., vol. 30, pp. 152-153, March 31, 1919.
308. Portage stratigraphy in western New York (abstract): Geol. Soc. America, Bull., vol. 30, p. 157, March 31, 1919.
309. Remarkable persistence of thin horizons (abstract): Geol. Soc. America, Bull., vol. 30, p. 157, March 31, 1919.
310. The Paleozoic rocks of the Canton quadrangle: New York State Mus., Bull. nos. 217, 218, 60 pp., 5 figs., 12 pls., map and sections, 1920.
311. Large fault in western New York: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 117-120, 2 figs., March 31, 1920.

Chamberlin, Rollin T.

312. The building of the Colorado Rockies: Jour. Geology, vol. 27, nos. 3 and 4, pp. 145-164, 225-251, 13 figs., 1919.
313. A peculiar belt of oblique faulting: Jour. Geology, vol. 27, no. 8, pp. 602-613, 3 figs., November-December, 1919.
314. The American Association for the Advancement of Science: Section E—Geology and geography [St. Louis meeting, December, 1919]: Science, new ser., vol. 51, pp. 491-495, 518-523, May 14 and 21, 1920.
315. Some glacier studies in Alaska (abstract): Science, new ser., vol. 51, p. 521, May 21, 1920.

Chamberlin, T. C.

316. Earth genesis: Illinois Acad. Sci., Trans., vol. 10, pp. 48-69 [1918].
317. Study of fundamental problems of geology: Carnegie Inst., Washington, Year Book no. 17, 1918, pp. 297-298, February, 1919; no. 18, 1919, pp. 343-345, March, 1920.
318. Investigation versus propagandism [age of Vero, Florida, deposits]: Jour. Geology, vol. 27, no. 5, pp. 305-338, July-August, 1919.
319. Diastrophism and the formative processes; X, The order of magnitude of the shrinkage of the earth deduced from Mars, Venus, and the moon: Jour. Geology, vol. 28, no. 1, pp. 1-17, January-February, 1920.
320. Diastrophism and the formative processes; XI, Selective segregation of material in the formation of the earth and its neighbors: Jour. Geology, vol. 28, no. 2, pp. 126-157, 2 pls., February-March, 1920.
321. Diastrophism and the formative processes; XII, The physical phases of the planetary nuclei during their formative stages: Jour. Geology, vol. 28, no. 6, pp. 473-504, September-October, 1920.
322. Diastrophism and the formative processes; XIII, The bearings of the size and rate of infall of planetesimals on the molten or solid state of the earth: Jour. Geology, vol. 28, no. 8, pp. 665-701, 1 fig., November-December, 1920.
323. The mathematics of isostasy: Am. Jour. Sci., 4th ser., vol. 49, pp. 311-323, 1 fig., May, 1920.

See also Matsuyama, no. 1189.

Chance, H. M.

324. (and Chance, T. M.). Low-sulphur coal in Pennsylvania: Am. Inst. Min. and Met. Eng., Bull. no. 152, pp. 1459-1468, August, 1919; Trans., vol. 63, pp. 649-659, 1920.

Chance, T. M.

- (with Chance, H. M.). Low-sulphur coal in Pennsylvania: *Am. Inst. Min. and Met. Eng., Bull.* no. 152, pp. 1459-1468, August, 1919; *Trans.*, vol. 63, pp. 649-659, 1920.

Chaney, Ralph W.

325. The flora of the Eagle Creek formation [Washington and Oregon]: Chicago, Univ., Walker Museum, *Contr.*, vol. 2, no. 5, pp. 115-181, 22 pls., 3 figs., July, 1920.
326. Further discussion of the ecological composition of the Eagle Creek flora (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 222, March 31, 1920.

Channing, J. Parke.

327. A silverless islet [Silver Islet, Lake Superior]: *Eng. and Min. Jour.*, vol. 108, p. 232, August 9, 1919.

Chapin, Theodore.

328. The structure and stratigraphy of Gravina and Revillagigedo islands, Alaska (U. S. Geol. Survey, *Prof. Paper* 120, pp. 83-100, 1918) (abstract by R. W. Stone): *Washington Acad. Sci., Jour.*, vol. 9, no. 2, p. 49, January 19, 1919.
329. The Nelchina-Susitna region, Alaska (U. S. Geol. Survey, *Bull.* 668, 1918) (abstract by R. W. Stone): *Washington Acad. Sci., Jour.*, vol. 9, no. 11, p. 320, June 4, 1919.
330. Platinum-bearing auriferous gravels of Chistochina River [Alaska]: U. S. Geol. Survey, *Bull.* 692, pp. 137-141, 1 fig., 1919.
331. Mining in the Fairbanks district [Alaska]: U. S. Geol. Survey, *Bull.* 692, pp. 321-327, 1 fig., 1919. Abstract by G. C. Martin, *Washington Acad. Sci., Jour.*, vol. 9, no. 20, pp. 635-636, December 4, 1919.
332. A molybdenite lode on Healy River [Alaska]: U. S. Geol. Survey, *Bull.* 692, p. 329, 1919. Abstract by G. C. Martin, *Washington Acad. Sci., Jour.*, vol. 9, no. 20, p. 636, December 4, 1919.
333. Mining in the Hot Springs district [Alaska]: U. S. Geol. Survey, *Bull.* 692, pp. 331-335, 1919. Abstract by G. C. Martin, *Washington Acad. Sci., Jour.*, vol. 9, no. 20, p. 636, December 4, 1919.
334. Tin deposits of the Ruby district [Alaska]: U. S. Geol. Survey, *Bull.* 692, p. 337, 1919.
335. Mining developments in the Matanuska coal field [Alaska]: U. S. Geol. Survey, *Bull.* 712, pp. 131-167, 3 pls., 4 figs., 1920.
336. Lode developments in the Willow Creek district [Alaska]: U. S. Geol. Survey, *Bull.* 712, pp. 169-176, 1 fig., 1920.

Chase, R. L.

337. The oil shale industry in Colorado: *Min. and Sci. Press*, vol. 118, p. 82, 1 fig., January 18, 1919.

Christensen, H. P.

338. Mineral industries of Illinois [map]. Scale 1: 500,000. Illinois State Geol. Survey, 1920.

Christner, D. D.

339. (and Wheeler, O. C.). The geology of Terrell County: Texas, Univ., *Bull.* no. 1819, pp. 1-32, 8 pls. (incl. map), April 1, 1918.

Clapp, Frederick G.

340. Geology of Cement oil field [Caddo County, Oklahoma]: *Mining and Metallurgy*, no. 158, sec. 1, pp. 34-35 (abstract), sec. 27, 9 pp., 1 fig., February, 1920.

Clark, Bruce L.

- 341. Eocene divisions of California (abstract): Geol. Soc. America, Bull., vol. 30, no. 1, p. 154, March 31, 1919.
- 342. Stratigraphic and faunal relationships of the Meganos group, middle Eocene (abstract with discussion): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 192-193, March 31, 1920.

Clark, Frank R.

- 343. Geology of the Lost Creek coal field, Morgan County, Utah (U. S. Geol. Survey, Bull. 691, pp. 311-322, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 318-319, June 4, 1919.
- 344. The Farnham anticline, Carbon County, Utah: U. S. Geol. Survey, Bull. 711, pp. 1-13, 2 pls. (incl. map), 1 fig., July 3, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 638, December 4, 1919.

Clark, Thomas H.

- 345. A section in the Trenton limestone at Martinsburg, New York: Harvard Coll., Mus. Comp. Zool., Bull. vol. 63, no. 1, pp. 1-18, 1 pl., May, 1919.
- 346. A new agelacrinitid from the Chazy of New York: Am. Jour. Sci., 4th ser., vol. 50, pp. 69-71, 1 fig., July, 1920.

Clark, W. O.

- 347. (and Riddell, C. W.). Exploratory drilling for water and use of ground water for irrigation in Steptoe Valley, Nevada; with an introduction by O. E. Meinzer: U. S. Geol. Survey, Water-Supply Paper 467, 70 pp., 6 figs., 6 pls. (incl. maps), 1920.

Clarke, Frank Wigglesworth.

- 348. The data of geochemistry; fourth edition: U. S. Geol. Survey, Bull. 695, 832 pp., 1920.

Clarke, John M.

- 349. Fourteenth report of the director of the State museum and science department, including the seventy-first report of the State museum, the thirty-seventh report of the State geologist, and the report of the State paleontologist for 1917: New York State Mus. Bull., nos. 207, 208 (March-April, 1918), 211 pp., illus., 1919.
- 350. Geological map of the Peninsula of Percé, P. Q., and its islands: New York State Mus. Bull. nos. 207, 208 (March-April, 1918, p. 147, map, 1919.
- 351. *Bunaia woodwardi*, a new merostome from the Silurian waterlimes of New York: Geol. Mag., new ser., dec. 6, vol. 6, pp. 531-532, 1 pl., December, 1919.
- 352. Fifteenth report of the director of the State museum and science department, including the seventy-second report of the State museum, the thirty-eighth report of the State geologist, and the report of the State paleontologist for 1918: New York State Mus. Bull. nos. 219, 220, 309 pp., pls., 1920.
- 353. Postbellum reflections on the place of paleontology among the sciences: New York State Mus. Bull. nos. 219, 220, pp. 123-128, 1920.
- 354. New Paleozoic crustaceans, I; *Bunaia*, a new merostome crustacean, from the New York Silurian waterlimes: New York State Mus. Bull. nos. 219, 220, pp. 128-134, 1 pl., 1920.

Clarke, John M.—Continued.

- 355. *Armstrongia*, a new genus of Devonian glass sponges: New York State Mus. Bull. nos. 219, 220, pp. 143-146, 1 pl., 1920.
- 356. The microscopic fauna of the Bonaventure conglomerate: New York State Mus. Bull. nos. 219, 220, pp. 147-148, 1920.
- 357. The great glass-sponge colonies of the Devonian; their origin, rise, and disappearance: Jour. Geology, vol. 28, no. 1, pp. 25-37, 19 figs., January-February, 1920.
- 358. (and Matthew, W. D.). Supposed fossil horse from the late Pleistocene found at Monroe, Orange County, New York (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 204, March 31, 1920.
- 359. A great American geologist of the last century, Professor James Hall (1811-98): Geol. Mag., vol. 57, pp. 483-486, port., November, 1920.

Clarke, Noah T.

- 360. The reconstruction of the Sterlingbush calcite cave: New York State Mus. Bull. nos. 219, 220, pp. 223-226, 1 pl., 1920.

Cleland, Herdman F.

- 361. Memorial of Henry Shaler Williams: Geol. Soc. America, Bull., vol. 30, pp. 47-65, port., March 31, 1919.
- 362. Practical applications of geology and physiography for use in the laboratory and class room. 69 pp., 50 figs., Excelsior Press, North Adams, Massachusetts, 1920.
- 363. The sixteenth annual New England intercollegiate geological excursion: Science, new ser., vol. 52, pp. 458-459, November 12, 1920.
- 364. The teaching of historical geology: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 375-382, September 30, 1920.
- 365. A Pleistocene peneplain in the Coastal Plain: Jour. Geology, vol. 28, no. 8, pp. 702-706, November-December, 1920.

Cockerell, T. D. A.

- 366. Some American Cretaceous fish scales; with notes on the classification and distribution of Cretaceous fishes (preface by T. W. Stanton): U. S. Geol. Survey, Prof. Paper 120, pp. 165-202, 7 pls., 1919, Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 15, pp. 440-441, September 19, 1919.
- 367. The oldest mosquitoes [*Culex winchesteri*, western Colorado]: Nature, vol. 103, p. 44, March 20, 1919.
- 368. Some fossil parasitic Hymenoptera: Am. Jour. Sci., 4th ser., vol. 47, pp. 376-380, 6 figs., May, 1919.
- 369. Eocene insects from the Rocky Mountains: U. S. Nat. Mus., Proc., vol. 57, pp. 233-260, 5 pls., 11 figs., 1920.

Cockfield, W. E.

- 370. Mayo area, Yukon: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 1-15, 1919.
- 371. Silver-lead deposits of the Twelvemile area, Yukon: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 15-17, 1919.
- 372. Explorations in the Ogilvie Range, Yukon: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 1-3, 1920.
- 373. Mayo area, Yukon: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 3-7, 1920.

Coffin, R. C.

374. (and Perini, V. C., jr., and Collins, M. J.). Some anticlines of western Colorado: Colorado Geol. Survey, Bull. 24, 61 pp., 13 figs., 2 pls. (maps), 1920.
375. An anticline in Montezuma County; Colorado Geol. Survey, Bull. 24, pp. 47-59, 1 fig., 1 pl. (map), 1920.

Cole, L. Heber.

376. Notes of a discovery of rock salt in Nova Scotia [near Malagash, Cumberland County]: Canadian Min. Jour., vol. 40, pp. 8-9, 3 figs., January 8, 1919.
377. The salt industry and the possibilities for the future development in Canada: Canadian Min. Jour., vol. 40, pp. 346-356, May 14, 1919.
378. Notes on the salt industry of Canada, with special reference to the recent discovery of rock salt in Nova Scotia: Canadian Min. Inst., Trans., vol. 22, pp. 433-443 [1920].

Coleman, A. P.

379. The glacial history of Prince Edward Island and the Magdalen Islands: Roy. Soc. Canada, Proc. and Trans., 3d ser., vol. 13, sec. 4, pp. 33-37, 1920.
380. Extent and thickness of the Labrador ice sheet: Geol. Soc. America, Bul., vol. 31, no. 2, pp. 319-328, 3 figs., June 30, 1920; abstract, no. 1, p. 128, March 31, 1920.
381. Lost placers of Ontario: Canadian Inst. Min. and Metall., Monthly Bull. no. 100, pp. 655-657, August, 1920.
382. Origin of the cobalt silver ores (discussion): Econ. Geology, vol. 15, no. 6, pp. 539-541, September, 1920.
383. Norite occurrences: Canadian Min. Jour., vol. 41, p. 966, November 26, 1920.

Collier, Arthur J.

384. Geology of northeastern Montana (U. S. Geol. Survey, Prof. Paper 120, pp. 17-39, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 17, p. 531, October 19, 1919.
385. The Nesson anticline, Williams County, North Dakota (U. S. Geol. Survey, Bull. 691, pp. 211-221, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 2, pp. 49-50, January 19, 1919.
386. Coal south of Mancos, Montezuma County, Colorado: U. S. Geol. Survey, Bull. 691, pp. 293-310, 6 pls. (incl. map), 2 figs., February 24, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 11, p. 318, June 4, 1919.
387. Oil in the Warm Springs and Hamilton domes, near Thermopolis, Wyoming: U. S. Geol. Survey, Bull. 711, pp. 61-73, 4 pls. (incl. maps), 1 fig., January 16, 1920. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 18, pp. 519-520, November 4, 1920.
388. Gas in the Big Sand Draw anticline, Fremont County, Wyoming: U. S. Geol. Survey, Bull. 711, pp. 75-83, 1 pl. (map), 2 figs., February 5, 1920. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 520, November 4, 1920.
389. Anticlines near Maverick Springs, Fremont County, Wyoming: U. S. Geol. Survey, Bull. 711, pp. 149-166, 3 pls. (incl. map), 1 fig., April 26, 1920.

Collins, M. J.

(with Coffin, R. C., and Perini, V. C., jr.). Some anticlines of western Colorado: Colorado Geol. Survey, Bull. 24, 61 pp., 13 figs., 2 pls. (maps), 1920.

(with Perini, V. C., jr.). Anticlines in Routt and Moffat counties: Colorado Geol. Survey, Bull. 24, pp. 7-46, 10 figs., 1 pl. (map), 1920.

Collins, W. H.

390. The ore deposits of Goudreau and Magpie-Hawk areas in Michipicoten district, Ontario: Canada, Geol. Survey, Summ. Rept., 1918, pt. E, pp. 4-30, 5 figs., 1919.

391. The Michipicoten iron ranges: Canadian Inst. Min. and Metal., Monthly Bull. no. 104, pp. 930-939, 1 pl., December, 1920.

Colony, R. J.

392. High-grade silica materials for glass, refractories, and abrasives: New York State Mus. Bull. nos. 203, 204, 31 pp., 15 pls., 1919.

393. A norite of the Sudbury type in Manitoba: a reconnaissance: Canadian Inst. Min. and Metal., Monthly Bull. no. 13, pp. 862-872, 7 figs., November, 1920; Canadian Min. Jour., vol. 41, pp. 967-970, 7 figs., November 26, 1920.

Condit, D. Dale.

394. Relations of late Paleozoic and early Mesozoic formations of southwestern Montana and adjacent parts of Wyoming (U. S. Geol. Survey, Prof. Paper 120, pp. 111-121, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 7, pp. 530-531, October 19, 1919.

395. Oil shale in western Montana, southeastern Idaho, and adjacent parts of Wyoming and Utah: U. S. Geol. Survey, Bull. 711, pp. 15-40, 1 pl. (map), 2 figs., September 27, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 638, December 4, 1919.

Condra, G. E.

396. Road materials of Nebraska; Part 2, Sand: Nebraska, Univ., Nebraska Conservation and Soil Survey, Bull. 6, 63 pp., 34 figs., Lincoln, Nebraska, 1917.

Connecticut State Geological and Natural History Survey.

397. Eighth biennial report of the commissioners . . . 1917-1918. Bull. no. 28, 21 pp., Hartford, 1919.

Cooke, Charles Wythe.

398. Tertiary mollusks from the Leeward Islands and Cuba: Carnegie Inst. Washington, Pub. 291, pp. 103-156, 16 pls., 1919.

399. Stratigraphic significance of *Orthaulax* (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 206, March 31, 1920.

400. Geologic reconnaissance in Santo Domingo (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 217-219, March 31, 1920.

Cooke, H. C.

401. Geology of Matachewan district, northern Ontario: Canada, Geol. Survey, Mem. 115, 60 pp., 5 figs., map, 1919.

402. Gabbros of East Sooke and Rocky Point [Vancouver Island, British Columbia]: Canada, Geol. Survey, Mus. Bull. no. 30, 48 pp., 1 fig., 1 map, November 15, 1919.

Cooke, H. C.—Continued.

403. Some stratigraphic and structural features of the pre-Cambrian of northern Quebec: Jour. Geology, vol. 27, nos. 2-5, pp. 65-78, 180-203, 263-275, 367-382, 13 figs., 1919.
404. The origin of the gold deposits of Matachewan district, northern Ontario: Econ. Geology, vol. 14, no. 4, pp. 281-301, 4 figs. (maps), June, 1919.
405. Matachewan [Ontario] gold area; the Otisse and Davidson gold deposits: Canadian Min. Jour., vol. 40, pp. 519-524, 5 figs., July 16, 1919.
406. Exploration of the townships west of Kirkland Lake, Ontario: Canada, Geol. Survey, Summ. Rept., 1919, pt. E, pp. 18-19, 1920.
407. A correlation of the pre-Cambrian formations of northern Ontario and Quebec: Jour. Geology, vol. 28, no. 4, pp. 304-332, 5 figs., May-June, 1920.

Corbett, Clifton S.

408. Method for projecting structure through an angular unconformity: Econ. Geology, vol. 14, no. 8, pp. 610-618, 4 figs., December, 1919.

Corral, José Isaac del.

409. Informe sobre el reconocimiento de la mina de cobre "La Niña" [Pinar del Río, Cuba]: Cuba, Dirección Montes y Minas, Bol. Minas no. 5, pp. 71-82, 1919.

Coryell, Horace Noble.

410. Parts of Pike and Adams counties: Illinois State Geol. Survey, Bull. no. 40, pp. 69-95, 6 pls. (incl. maps), 2 figs., 1919.

Coste, Eugene.

411. [The occurrence of oil in Alberta] (discussion): Am. Inst. Min. and Met. Eng., Bull. no. 148, pp. 718-719, April, 1919.

Cottingham, Kenneth.

412. The origin of the caves at Put-in-Bay, Ohio: Ohio Jour. Sci., vol. 20, no. 2, pp. 38-42, 4 figs., December, 1919.

Cottrell, K. W.

413. Peat in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 2, pp. 41-46, October 14, 1920.

Crampton, Theo. H. M.

414. Copper schist deposits of Arizona: Eng. and Min. Jour., vol. 107, p. 689, April 19, 1919.

Crane, W. R.

415. The mining and preparation of manganese ores in Tennessee: Tennessee State Geol. Survey, Resources of Tennessee, vol. 9, no. 1, pp. 32-47, 5 figs., January, 1919.

(with Hull, J. P. D., and La Forge, Laurence). Report on the manganese deposits of Georgia: Georgia Geol. Survey, Bull. no. 35, 295 pp., 11 pls., 26 figs., 2 maps, Atlanta, 1919.

Crawford, R. D.

416. (and Willson, K. M., and Perini, V. C.). Some anticlines of Routt County, Colorado: Colorado Geol. Survey, Bull. 23, 61 pp., 10 figs., 3 pls. (incl. map), 1920.

Crook, Alja Robinson.

417. The composition and origin of Monk's Mound [St. Clair County, Illinois]: Illinois Acad. Sci., Trans., vol. 9, pp. 82-84 [1917].

418. Guide to the mineral collections in the Illinois State Museum. 294 pp., 31 pls., 236 figs., Springfield, Illinois, 1920.

Crosby, Warren O.

419. Certain aspects of glaciation in Alaska (abstract): Geol. Soc. America, Bull., vol. 30, no. 1, p. 115, March 31, 1919.

420. Certain aspects of glacial erosion in Alaska (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 132, March 31, 1920.

Cross, J. G.

421. Lake Shebandowan nickel deposit: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 1, pp. 225-234, 5 figs., 1920.

422. Pre-Cambrian rocks and iron ore deposits in the Abitibi-Mattagami area: Ontario Bur. Mines, 29th Ann. Rept., vol. 29, pt. 2, pp. 1-18, 11 figs., map, 1920.

Cross, Whitman.

423. Geology in the world war and after: Geol. Soc. America, Bull., vol. 30, no. 1, pp. 165-188, March 31, 1919.

424. Louis Valentine Pirsson: Am. Jour. Sci., 4th ser., vol. 50, pp. 173-187, port., September, 1920.

425. (and others). The Kilauea volcano observatory: Nat. Acad. Sci., Proc., vol. 6, no. 12, pp. 706-716, December 15, 1920.

Crouse, C. S.

426. The oil shales of Estill County, Kentucky: Eng. and Min. Jour., vol. 110, no. 1, pp. 24-27, July 3, 1920.

Crowell & Murray.

427. The iron ores of Lake Superior. Fourth edition, 301 pp., pls., maps, and figs., Cleveland, The Penton Press, 1920.

Culver, Harold E.

428. The coal fields of southwestern Washington: Washington Geol. Survey, Bull. no. 19, 155 pp., 24 pls (incl. maps), 12 figs., 1919.

Currier, L. W.

(with Weller, Stuart, and others). The geology of Hardin County and the adjoining part of Pope County: Illinois State Geol. Survey, Bull. no. 41, 416 pp., 30 figs., 11 pls., 1920.

Currier & Company.

429. New oil and geological map of Texas . . . Scale, 28 miles to 1 inch (about). Kansas City, Missouri, no date [1920?].

Cushman, Joseph Augustine.

430. Pliocene Foraminifera of the Coastal Plain of the United States (U. S. Geol. Survey, Bull. 676, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 328-329, June 4, 1919.

431. The age of the underlying rocks of Florida as shown by the Foraminifera of well borings: Florida State Geol. Survey, Twelfth Ann. Rept., pp. 77-103, 1 fig., 1919.

432. Fossil Foraminifera from the West Indies: Carnegie Inst. Washington, Pub. no. 291, pp. 21-71, 15 pls., 8 figs., 1919.

Cushman, Joseph Augustine—Continued.

- 433. Lower Cretaceous age of the limestones underlying Florida: Washington Acad. Sci., Jour., vol. 9, no. 3, pp. 70-73, February 4, 1919.
- 434. Some relationships of the foraminiferal fauna of the Byram calcareous marl [Hinds County, Mississippi]: Washington Acad. Sci., Jour., vol. 10, no. 7, pp. 198-201, April 4, 1920.
- 435. The American species of *Orthophragmina* and *Lepidocyclina*: U. S. Geol. Survey, Prof. Paper 125, pp. 39-105, 29 pls., 1 fig., July 26, 1920.
- 436. Lower Miocene Foraminifera of Florida: U. S. Geol. Survey, Prof. Paper 128, pp. 67-74, 1 pl., August 12, 1920.
- 437. Value of Foraminifera in stratigraphic correlation (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 205, March 31, 1920.
- 438. Foraminiferal fauna of the Byram marl (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 215, March 31, 1920.

Dachnowski, Alfred P.

- 439. Correlation work in peat-land problems: Bot. Gazette, vol. 70, no. 6, pp. 453-458, December, 1920.
- 440. Peat deposits in the United States and their classification: Soil Science, vol. 10, no. 6, pp. 453-465, December, 1920.

Dake, C. L.

- 441. The sand and gravel resources of Missouri: Missouri Bur. Geology and Mines, 2d ser., vol. 15, 274 pp., 47 pls., 2 figs., 1918.
- 442. Glacial features on the south side of Beartooth Plateau, Wyoming: Jour. Geology, vol. 27, no. 2, pp. 128-131, 1 fig., February-March, 1919.
- 443. The horizon of the marine Jurassic of Utah: Jour. Geology, vol. 27, no. 8, pp. 634-646, 10 figs. November-December, 1919.
- 444. The pre-Moenkopi (pre-Permian?) unconformity of the Colorado Plateau: Jour. Geology, vol. 28, no. 1, pp. 61-74, 8 figs., January-February, 1920. Abstract, Science, new ser., vol. 51, p. 492, May 14, 1920.
- 445. Episodes in Rocky Mountain orogeny (abstract): Science, new ser., vol. 51, pp. 520-521, May 21, 1920.

Dale, Nelson C.

- 446. Provisional report of the areal and structural geology of the western flank of the Green Mountain Range: Vermont, State Geologist, 11th Rept., pp. 194-199 [1919].
- 447. Postglacial manganese in Columbia County, New York: New York State Mus. Bull., nos. 207, 208 (March-April, 1918), pp. 85-100, 5 figs., 1919.

Dale, T. Nelson.

- 448. Practical geology of monumental stones: Monumental News, vol. 32, no. 10, pp. 764-765, no. 12, pp. 914-915, vol. 33, no. 1, pp. 42-44, no. 3, pp. 202-204, no. 4, pp. 272-273, 7 figs., October, December, 1919; January, March, April, 1920.
- 449. Local unconformity between the Berkshire schist and the Stockbridge limestone in Adams, Mass.: Am. Jour. Sci., 4th ser., vol. 49, pp. 369-371, May, 1920.

Dall, William Healey.

- 450. On some Tertiary fossils from the Pribilof Islands: Washington Acad. Sci., Jour., vol. 9, no. 1, pp. 1-3, January 4, 1919.

Dall, William Healey—Continued.

451. Pliocene and Pleistocene fossils from the Arctic coast of Alaska and the auriferous beaches of Nome, Norton Sound, Alaska: U. S. Geol. Survey, Prof. Paper 125, pp. 23-37, 2 pls., January 27, 1920. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 11, p. 327, June 4, 1920.

Daly, M. R. See Monte-Flores, no. 1286.

Daly, Reginald A.

452. Report of the Sturgis Hooper professor of geology: Harvard Coll., Mus. Comp. Zoology, Ann. Rept. 1918-19, p. 13, 1919.
453. The coral-reef zone during and after the glacial period: Am. Jour. Sci., 4th ser., vol. 48, pp. 136-159, August, 1919.
454. Report of the Sturgis Hooper professor of geology; Report on the department of geology and geography: Harvard College, Mus. Comp. Zool., Ann. Rept., 1919-1920, pp. 15-19, 1920.
455. Changes of land and ocean levels (abstract): Washington Acad. Sci., Jour., vol. 10, no. 2, pp. 50-51, January 19, 1920.
456. The planetesimal hypothesis in relation to the earth: Sci. Monthly, vol. 10, no. 5, pp. 482-495, May, 1920.
457. A general sinking of sea level in recent time: Nat. Acad. Sci., Proc., vol. 6, no. 5, pp. 246-250, May 15, 1920.
458. Oscillations of level in the belts peripheral to the Pleistocene ice caps: Geol. Soc. America, Bull., vol. 31, no. 2, pp. 303-318, 1 pl., June 30, 1920; abstract, no. 1, pp. 111-112, March 31, 1920.
459. A recent world-wide sinking of ocean level: Geol. Mag., vol. 57, pp. 246-261, June, 1920. Abstract, Geol. Soc. America, Bull., vol. 31, no. 1, p. 112, March 31, 1920.

Darling, S. M.

460. Notes on lignite; its characteristics and utilization: U. S. Bur. Mines, Tech. Paper 178, 16 pp., 1919.

Darton, N. H.

461. Description of the Newell quadrangle, South Dakota: U. S. Geol. Survey, Geol. Atlas, Newell folio, no. 209, 7 pp., 6 figs., 3 maps, illus. sheet, 1919.
462. Description of the Syracuse and Lakin quadrangles, Kansas: U. S. Geol. Survey, Geol. Atlas, Syracuse-Lakin folio (no. 212), 10 pp., 7 figs., 6 maps, illus. sheet, 1920.
463. Artesian waters in the vicinity of the Black Hills, South Dakota (U. S. Geol. Survey, Water-Supply Paper 428, 1918) (abstract): Washington Acad. Sci., Jour., vol. 10, no. 7, p. 209, April 4, 1920.
464. Geothermal data of the United States, including many original determinations of underground temperature: U. S. Geol. Survey, Bull. 701, 97 pp., 3 figs., 1 pl. (map), 1920. Abstract by M. I. Goldman, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 519, November 4, 1920.
465. Structure of some mountains in New Mexico (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 116, March 31, 1920.

Davidson, Pirie.

466. A cestraciont spine from the middle Triassic of Nevada: California, Univ., Dept. Geology, Bull., vol. 11, no. 4, pp. 433-435, 2 figs., May 9, 1919.

Davis, A. W.

467. The Dolly Varden mine, Alice Arm, British Columbia: Canadian Min. Inst., Monthly Bull. no. 94, pp. 159-161, February, 1920.

Davis, C. W.

- (with Lind, S. C.). A new deposit of uranium ore [Lusk, Wyoming]: Science, new ser., vol. 49, pp. 441-443, May 9, 1919.

Davis, E. F.

468. The registration of earthquakes at the Berkeley Station and at the Lick Observatory Station from October 1, 1917, to March 31, 1918: California, Univ., Seismographic Stations, Bull. no. 15, pp. 325-338, August 7, 1919.
469. The registration of earthquakes at the Berkeley Station and at the Lick Observatory Station from April 1, 1918, to September 30, 1918: California, Univ., Seismographic Stations, Bull. no. 16, pp. 339-355, April 10, 1920.
470. The registration of earthquakes at the Berkeley Station and at the Lick Observatory Station from October 1, 1918, to March 31, 1919: California, Univ., Seismographic Stations, Bull., no. 17, pp. 357-370, April 21, 1920.
471. The registration of earthquakes at the Berkeley Station and at the Lick Observatory Station from April 1, 1919, to September 30, 1919: California, Univ., Seismographic Stations, Bull., no. 18, pp. 371-385, April 21, 1920.

Davis, William Morris.

472. The geological aspects of the coral-reef problem: Science Progress, vol. 13, no. 51, pp. 420-444, 3 figs., January, 1919.
473. The framework of the earth: Am. Jour. Sci., 4th ser., vol. 48, pp. 225-241, September, 1919.
474. Framework of the earth (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 110, March 31, 1920.
- See also Brown, no. 204; Woodworth, no. 2037.

Davy, W. Myron.

475. (and Farnham, C. Mason). Microscopic examination of ore minerals. 154 pp., New York, McGraw-Hill Book Co., 1920. Review by H. E. Merwin, Econ. Geology, vol. 15, no. 7, pp. 618-619, November, 1920. Review by E. T. Wherry, Am. Mineralogist, vol. 5, no. 8, pp. 152-154, August, 1920.
476. A reflecting microscope for the mining engineer: Mining and Metallurgy, no. 163, pp. 30-31, 1 fig., July, 1920 (abstract); Am. Inst. Min. and Met. Eng., Trans. [preprint no. 996], 7 pp., 2 figs., 1920.

Day, Arthur L.

477. George Ferdinand Becker: Am. Jour. Sci., 4th ser., vol. 48, pp. 242-245, September, 1919.
478. Memorial of George Ferdinand Becker: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 14-25, port., March 31, 1920.

Dean, Bashford.

479. Charles Rochester Eastman: Science, new ser., vol. 49, pp. 139-141, February 7, 1919.
480. Memoir of Charles Rochester Eastman: Geol. Soc. America, Bull., vol. 30, pp. 27-36, port., March 31, 1919.
481. Dr. Moodie's opisthotonos: Science, new ser., vol. 49, p. 357, April 11, 1919.

De Beque, G. Robert.

482. Oil shales of De Beque, Colorado: Eng. and Min. Jour., vol. 109, pp. 348-353, 3 figs., January 31, 1920.

Decker, Charles E.

483. Studies in minor folds. 89 pp., 44 figs., 3 pls., University of Chicago Press, Chicago, Illinois, September, 1920.

De Geer, Gerard.

484. On the determination of geochronology by a study of laminated deposits: Science, new ser., vol. 52, pp. 502-503, November 26, 1920.

De Golyer, E.

485. The West Point, Texas, salt dome, Freestone County: Jour. Geology, vol. 27, no. 8, pp. 647-663, 2 figs., November-December, 1919.

486. Theory of volcanic origin of salt domes (with discussion by J. A. Udden and E. T. Dumble): Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 456-477, 1920.

See also Ambrose, no. 29; Hackford, no. 728; Ordoñez, no. 1397; Washburne, no. 1955.

Dellenbaugh, Frederick S.

487. Memorial to John Wesley Powell: Am. Anthropologist, vol. 20, no. 4, pp. 432-436, 2 pls., October-December, 1918.

De Lury, J. S.

488. Mineral prospects in southeastern Manitoba; Rice Lake, Maskwa River, and Boundary districts. 55 pp., illus., Manitoba Bulletins, Office of Commissioner of northern Manitoba, The Pas, Manitoba [1920].

489. Some economic aspects of the Falcon Lake district, Manitoba: Canadian Min. Inst., Trans., vol. 22, pp. 320-328 [1920].

490. An occurrence of tin near the Ontario-Manitoba boundary: Canadian Min. Jour., vol. 41, pp. 520-521, 2 figs., June 25, 1920.

Denis, Théo. C.

491. Report on mining operations in the Province of Quebec during the year 1918: Quebec (Province), Department of Colonization, Mines, and Fisheries, 158 pp., map, Quebec, 1919.

492. Report on mining operations in the Province of Quebec during the year 1919: Quebec (Province), Department of Colonization, Mines, and Fisheries, 160 pp., pls., map, Quebec, 1920.

Denison, F. Napier.

493. The British Columbia earthquake of December 6, 1918: Seismol. Soc. America, Bull., vol. 9, no. 1, pp. 20-23, March, 1919.

De Wolf, F. W.

494. The outlook for geology and geography: School Science and Mathematics, vol. 19, no. 5, pp. 391-397, May, 1919.

495. Administrative report from July 1, 1916, to June 30, 1917: Illinois State Geol. Survey, Bull. no. 36, pp. 9-18, 1920.

496. Gravel and limestone in Illinois: Illinois Soc. Engineers, 35th Ann. Rept., pp. 72-73, 1920.

497. (and Mylius, L. A.). A new Trenton field in Illinois: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 43-46, 1 fig., 1920.

Díaz Lozano, Enrique.

498. Depósitos diatomíferos en el Valle de Toxi, Ixtlahuaca, Estado de México: México, Inst. Geol., Anales, no. 9, pp. 1-19, 5 pls., 1920.
499. Manantiales en el pueblo de Tepexi de Rodríguez, Estado de Puebla: México, Inst. Geol., Anales, no. 9, pp. 21-29, 9 pls., 1920.

Diller, J. S.

500. Recent studies of domestic chromite deposits: Am. Inst. Min. and Met. Eng., Bull. no. 153, pp. 1995-2040, 29 figs., September, 1919; Trans., vol. 63, pp. 105-149, 26 figs., 1920.
501. Chromite in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 657-679, 1 fig., May 15, 1920.
502. Asbestos in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 545-556, March 20, 1920.
503. Tale and soapstone in 1918. U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 557-563, March 29, 1920.
504. (and Fairchild, J. G., and Larsen, E. S.). High-grade tale for gas burners: Econ. Geology, vol. 15, no. 8, pp. 665-673, December, 1920.

Dolmage, Victor.

505. Quatsino Sound and certain mineral deposits of the west coast of Vancouver Island, British Columbia: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 30-38, 1 fig., 1919.
506. Barkley Sound, Vancouver Island, British Columbia: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 12-20, 1920.
507. Sunloch copper district [Vancouver Island], British Columbia: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 20-30, 2 figs. (incl. map), 1920.
508. The high-grade silver ores of the Stewart district, British Columbia: Canadian Min. Jour., vol. 41, pp. 454-458, 10 figs., June 4, 1920.

Dolman, C. D.

509. Magnesite; its geology, products, and their uses: Am. Inst. Min. and Met. Eng., Bull. no. 152, pp. 1193-1202, 2 figs., August, 1919; (with discussion), Trans., vol. 63, pp. 175-187, 2 figs., 1920.

Dorsey, George Edwin.

510. Stratigraphy and structure of the Newark system in Maryland and its relation to the Newark system of eastern North America (abstract): Geol. Soc. America, Bull., vol. 30, pp. 155-157, March 31, 1919.

Dougherty, Ellsworth Y.

511. The gold quartz lodes of Porcupine, Ontario: Min. and Sci. Press, vol. 118, pp. 532-536, 10 figs., April 19, 1919.
512. Relation of regional deformations to the distribution of ore in the pre-Cambrian: Min. and Sci. Press, vol. 119, pp. 227-230, 1 fig., August 16, 1919.

Dove, Leonard P.

- (with Barrett, Edward). Workable coal seams of Indiana; pyrite in the coals of Indiana. Indiana, Year Book 1918, pp. 219-238, 1919.

Dowling, D. B.

513. (and Slipper, S. E., and McLearn, F. H.). Investigations in the gas and oil fields of Alberta, Saskatchewan, and Manitoba: Canada, Geol. Survey, Mem. 116, 89 pp., 14 pls. (incl. maps), 1919.

Dowling, D. B.—Continued.

- 514. The structure and correlation of the formations underlying Alberta, Saskatchewan, and Manitoba: Canada, Geol. Survey, Mem. 116, pp. 1-9, 1919.
- 515. Records of selected wells arranged in east-west order [Manitoba, Saskatchewan, and Alberta]: Canada, Geol. Survey, Mem. 116, pp. 34-84, map, 1919.
- 516. Gasoline in natural gas; experiments on Alberta gas: Canada, Geol. Survey, Summ. Rept., 1918, pt. C, pp. 17-42, 1 fig., 1919.
- 517. Oil possibilities and developments in the Great Plains: Canada, Geol. Survey, Summ. Rept., 1919, pt. C, pp. 20-24, 1 map, 1920.
- 518. [The occurrence of oil in Alberta] (discussion): Am. Inst. Min. and Met. Eng., Bull. no. 149, p. 854, May, 1919.
- 519. The possibilities of the oil resources of Canada: Canadian Min. Jour., vol. 41, pp. 287-292, 2 figs., April 9, 1920.
- 520. The oil possibilities of western Canada: Canadian Min. Inst., Mo. Bull., no. 98, pp. 469-477, 2 figs., June, 1920.

Drummond, R.

- 521. Minerals and mining, Nova Scotia. 368 pp., Mining Record Office, Stelarton, N. S., 1918.

Drury, Charles W.

- 522. Cobalt; its occurrence, metallurgy, uses, and alloys: Ontario Bur. Mines, Rept. 1918, vol. 27, pt. 3, sec. 1, 133 pp., map, 27 figs., 1919.

Dub, George D.

- 523. (and Moses, Frederick G.). Mining and preparing domestic graphite for crucible use: U. S. Bur. Mines, Bull. 112, 80 pp., 5 pls., 20 figs., 1920.

Duce, J. F. See White, no. 2004.

Dumble, E. T.

- 524. The geology of east Texas: Texas, Univ., Bull. no. 1869, 388 pp., 12 pls. (incl. map), December 10, 1917 [published February, 1920].

Dunbar, Carl O.

- 525. Stratigraphy and correlation of the Devonian of western Tennessee: Tennessee State Geol. Survey, Bull. 21, 127 pp., 3 pls., 11 figs., 1919.
- 526. New species of Devonian fossils from western Tennessee: Connecticut Acad. Arts and Sci., Trans., vol. 23, pp. 109-158, 5 pls., February, 1920.

Dunlop, J. P.

- 527. (and Butler, B. S.). Silver, copper, lead, and zinc in the Central States in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 59-125, October 31, 1919.
- 528. Gold and silver in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 727-781, 1 fig., 1 pl., July 15, 1920.
- 529. Gold, silver, copper, lead, and zinc in the Eastern States in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 1, pp. 41-50, November 8, 1920.

Eakin, Henry M.

- 530. The Porcupine gold placer district, Alaska: U. S. Geol. Survey, Bull. 699, 29 pp., 8 pls. (incl. maps), 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 11, p. 326, June 4, 1920.

Eakle, Arthur S.

531. New and rare minerals formed in limestone by contact metamorphism (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 162-163, March 31, 1920.
532. Vonsenite; a preliminary note on a new mineral [from Riverside, California]: *Am. Mineralogist*, vol. 5, no. 8, pp. 141-143, August, 1920.

Eaton, Harry N.

533. Some subordinate ridges of Pennsylvania: *Jour. Geology*, vol. 27, no. 2, pp. 121-127, 1919.
534. Notes on certain conglomeratic structures in limestones in central Pennsylvania: *Science*, new ser., vol. 49, p. 474, May 16, 1919.
535. The Oriskany sandstone faunule at Oriskany Falls, New York (abstract): *Science*, new ser., vol. 51, p. 493, May 14, 1920.

Eckes, Charles R.

536. Description of cuttings from the Duffer wells, Ranger field [Texas] (with discussion): *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 39-43, 1919.

Eddingfield, F. T.

- (with Harder, E. C.). The iron ores of the world: *Eng. and Min. Jour.*, vol. 109, pp. 1060-1064, May 8, 1920.

Ede, J. A.

537. Mineral resources of the La Salle district [Illinois]: *Am. Inst. Min. and Met. Eng., Bull.* no. 153, pp. 2609-2630, 8 figs., September, 1919; *Trans.*, vol. 63, pp. 244-265, 8 figs., 1920.

Eggleston, J. W.

538. Eruptive rocks at Cuttingsville, Vermont: *Vermont, State Geologist*, 11th Rept., pp. 167-193, 2 pls. (incl. map) [1919].

Ehlers, George M.

539. An interesting illustration of a process of destruction of a glaciated surface: *Michigan Acad. Sci.*, 20th Ann. Rept., pp. 59-63, 2 pls., 2 figs., 1918.
540. *Heterolasma foerstei*, a new genus and species of Tetracoralla from the Niagaran of Michigan: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 461-467, 3 figs., December, 1919.
541. Notes on the stratigraphy of the Racine formation of the Northern Peninsula of Michigan: *Michigan Acad. Sci.*, 21st Ann. Rept., pp. 87-90, 1920.

Ellis, Arthur J.

542. (and Lee, Charles H.). Geology and ground waters of the western part of San Diego County, California: *U. S. Geol. Survey, Water-Supply Paper* 446, 321 pp., 47 pls. (incl. maps), 18 figs., 1919.
543. Mineral waters in 1917 *U. S. Geol. Survey, Mineral Resources*, 1917, pt. 2, pp. 483-520, April 21, 1919.
544. Mineral waters in 1918: *U. S. Geological Survey, Mineral Resources*, 1918, pt. 2, pp. 495-531, 1 pl. (map), March 19, 1920.

Ellis, Robert W.

545. The oil situation in New Mexico: *New Mexico, State Univ., Bull.* 101, (Geol. Series 3), 48 pp., map, December, 1920.

Ellisor, Alva Christine.

546. Species of *Turritella* from the Buda and Georgetown limestones of Texas: Texas. Univ., Bull. no. 1840, 26 pp., 4 pls., July 15, 1918.

Ells, S. C.

547. The bituminous sands of northern Alberta (abstract): Geol. Mag., new ser., dec. 6, vol. 6, p. 142, March, 1919.

Emerson, B. K.

548. William Bullock Clark (1860-1917): Am. Acad. Arts, Proc., vol. 54, no. 6, pp. 412-415, September, 1919.

Emerson, Frederick V.

549. Some Port Hudson outcrops in Louisiana: Science, new ser., vol. 50, p. 460, November 14, 1919.

550. Agricultural geology. 319 pp., 270 figs., New York, John Wiley & Sons, 1920.

Emmons, W. H. See Udden, no. 1838.

Engineering and Mining Journal.

551. The origin of iron ores: Eng. and Min. Jour., vol. 109, p. 1053, May 8, 1920.

Erni, C. P.

552. (and Beals, C. C.). Soil survey of Carroll County: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 45-66, map, 1917.

Evans, George Watkin.

553. Preliminary report on the Horseshoe district of the Teton coal basin, southeastern Idaho: U. S. Bur. Mines, Bull., 166, pp. 90-103, 1 pl. (map), 3 figs., 1919.

Evans, Isabel P.

554. Bibliography of quicksilver in North America: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 425-455, March 18, 1919.

555. Recent publications on quicksilver in North America: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 179-182, October 31, 1919.

Fairchild, Herman Leroy.

556. Pleistocene marine submergence of the Hudson, Champlain, and St. Lawrence valleys: New York State Mus., Bull., nos. 209, 210, 76 pp., 25 pls. (incl. maps), 1919.

557. Postglacial sea-level waters in eastern Vermont: Vermont, State Geologist, 11th Rept., pp. 52-75, 1 pl., 2 figs. [1919].

558. Henry Augustus Ward: Rochester Acad. Sci., Proc., vol. 5, pp. 241-251, port., May, 1919.

559. Grove Karl Gilbert: Rochester Acad. Sci., Proc., vol. 5, pp. 251-259, port., May, 1919.

560. Edwin Eugène Howell: Rochester Acad. Sci., Proc., vol. 5, pp. 253-261, May, 1919.

561. The Rochester Canyon and the Genesee River base-levels: Rochester Acad. Sci., Proc., vol. 6, pp. 1-55, 14 pls., 13 figs., October, 1919.

562. Postglacial uplift of southern New England: Geol. Soc. America, Bull., vol. 30, no. 4, pp. 597-636, 3 figs., December 31, 1919.

563. Postglacial uplift of the New England coastal region (abstract): Geol. Soc. America, Bull., vol. 30, pp. 89-90, March 31, 1919.

Fairchild, Herman Leroy—Continued.

564. A nature drama [Pleistocene, New York State]: *Sci. Monthly*, vol. 10, no. 4, pp. 405-417, 13 figs., April, 1920.

565. Musical sands: *Science*, new ser., vol. 51, pp. 62-64, January 16, 1920.

566. The latest glacial features in the United States (abstract): *Science*, new ser., vol. 51, p. 493, May 14, 1920.

567. Pleistocene clays as a chronometer: *Science*, new ser., vol. 52, pp. 284-286, September 24, 1920.

See also Stoller, no. 1732.

Fairchild, J. G.

568. Notes on the analysis of mineral sulphide water: *Washington Acad. Sci. Jour.*, vol. 10, no. 20, pp. 559-565, December 4, 1920.

(with Miser, H. D.). Hausmannite in the Batesville district, Arkansas: *Washington Acad. Sci. Jour.*, vol. 10, no. 1, pp. 1-8, January 4, 1920.

(with Diller, J. S., and Larsen, E. S.). High-grade talc for gas burners: *Econ. Geology*, vol. 15, no. 8, pp. 665-673, December, 1920.

Fansett, George R.

569. Field tests for the common metals; 3d ed., revised: *Arizona, Bur. Mines, Bull. no. 105 (Min. Tech. Ser. no. 23)*, 29 pp., 1920.

Faribault, E. R.

570. Investigations in western Nova Scotia: *Canada, Geol. Survey, Summ. Rept.*, 1917, pt. F, pp. 17-20, 1918.

571. Investigations in western Nova Scotia: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. F, pp. 1-4, 1919.

572. Investigations in southwestern Nova Scotia: *Canada, Geol. Survey, Summ. Rept.*, 1919, pt. F, pp. 2-20, 4 maps, 1920.

Farnham, C. Mason.

(with Davy, W. Myron). Microscopic examination of ore minerals. 154 pp., New York, McGraw-Hill Book Co., 1920. Review by H. E. Merwin, *Econ. Geology*, vol. 15, no. 7, pp. 618-619, November, 1920. Review by E. T. Wherry, *Am. Mineralogist*, vol. 5, no. 8, pp. 152-154, August, 1920.

Farnum, Dwight.

573. Carnotite in the Gateway district of Colorado and Utah: *Min. and Sci. Press*, vol. 119, pp. 127-128, 1 fig., July 26, 1919.

Farrington, Oliver C.

574. Etching iron meteorites: *Am. Mineralogist*, vol. 5, no. 3, pp. 57-59, March, 1920.

Fath, A. E.

575. The origin of the faults, anticlines, and buried "granite ridge" of the northern part of the Mid-Continent oil and gas field: *U. S. Geol. Survey, Prof. Paper 128*, pp. 75-84, 3 pls., 3 figs., August 13, 1920.

Fay, Albert H.

576. A glossary of the mining and mineral industry: *U. S. Bur. Mines. Bull. 95*, 754 pp., 1920.

Fearing, Frederick C.

577. Alaska tin deposits: *Eng. and Min. Jour.*, vol. 110, no. 4, pp. 154-158, 3 figs., July 24, 1920.

Fenner, Clarence N.

578. Geology of the Katmai region, Alaska, and the great eruption of 1912 (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 140, March 31, 1920.

579. The Katmai region, Alaska, and the great eruption of 1912: *Jour. Geology*, vol. 28, no. 7, pp. 569-606, 17 figs., October-November, 1920.

Fenton, Carroll Lane.

580. The Hackberry stage of the upper Devonian of Iowa: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 355-376, 5 figs. (incl. map), November, 1919.

Ferguson, Henry G.

581. Graphite in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 2, pp. 223-265, 4 figs., 1 pl., October, 1919.

See also Scott, no. 1600.

Ferguson, Jim G.

582. Outlines of the geology, soils, and minerals of the State of Arkansas [cover title, *Outlines of Arkansas geology*]. 192 pp., illus., published by the [Arkansas] State Bureau of Mines, Manufactures and Agriculture, Little Rock, 1920.

Ferguson, John B.

583. (and Merwin, H. E.). The ternary system CaO-MgO-SiO_2 : *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 81-123, 17 figs., August, 1919.

584. (and Merwin, H. E.). Wollastonite (CaO-SiO_2) and related solid solutions in the ternary system lime-magnesia-silica: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 165-189, 8 figs., September, 1919.

585. The oxidation of lava by steam: *Washington Acad. Sci., Jour.*, vol. 9, no. 18, pp. 539-546, November 4, 1919.

586. (and Buddington, A. F.). The binary system åkermanite-gehlenite: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 131-140, 4 figs., August, 1920.

Fernández Peralta, Ricardo.

- (with Tristán, J. Fidel). Informe presentado al Señor Ministro de Instrucción Pública sobre la actividad del volcán Irazú. Colegio de Señoritas, Publicaciones, Serie A, no. 1, 1917 [not seen]. *La Gaceta, Diario Oficial*, año 39, no. 130, pp. 662-664, 6 figs., San José, Costa Rica, December 4, 1917.

Ferrier, W. F.

587. (assisted by Ferrier, Dorothy J.). Annotated catalogue of and guide to the publications of the Geological Survey, Canada, 1845-1917. 544 pp., Canada, *Geol. Survey*, 1920.

Fettke, Charles Reinhard.

588. Glass manufacture and the glass sand industry of Pennsylvania: *Pennsylvania Topog. and Geol. Survey, Rept.* no. 12, 278 pp., 108 pls., 1918 [1919 on cover-title].

589. (and Hubbard, Bela). Limonite deposits of Mayaguez Mesa, Porto Rico: *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 97-112, 8 figs., 1920.

Field, Richard M.

590. The middle Ordovician of central and south central Pennsylvania: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 403-428, 3 figs., December, 1919.

Field, Richard M.—Continued.

591. Origin of the "beach rock" (coquina) at Loggerhead Key, Tortugas (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 215, March 31, 1920.
592. The use of the term fossil: *Science, new ser.*, vol. 51, pp. 634-635, June 25, 1920.

Finch, R. H.

593. [Observations on Halemaumau]: *Hawaiian Volcano Observatory, Monthly Bull.*, vol. 8, nos. 3-5, pls., 1920.

Finlay, J. R.

594. The geology and economics of coal: *Eng. and Min. Jour.*, vol. 107, pp. 945-950, May 31, 1919.

Fippin, Elmer O.

595. More on singing sands: *Science, new ser.*, vol. 51, p. 64, January 16, 1920.

Fischer, Arthur Homer.

596. A summary of mining in the State of Washington: *Washington, Univ., Engineering Exper. Sta. Series, Bull. no. 4*, 124 pp., map, November, 1918.

Flint, George M.

597. Famous mineral localities; Beryl Hill, Grafton, New Hampshire: *Am. Mineralogist*, vol. 4, no. 3, pp. 21-22, 1 pl., March, 1919.

Foerste, Aug. F.

598. Echinodermata of the Brassfield (Silurian) formation of Ohio: *Denison Univ., Sci. Lab., Bull.*, vol. 19, pp. 3-32, 7 pls., 1 fig., April, 1919.

599. Silurian fossils from Ohio, with notes on related species from other horizons: *Ohio Jour. Sci.*, vol. 19, no. 7, pp. 367-404, 2 figs., 4 pls., May, 1919.

600. Notes on *Isotelus*, *Acrolichas*, *Calymene*, and *Encrinurus*: *Denison Univ., Sci. Lab., Bull.*, vol. 19, pp. 65-82, 6 pls., September, 1919.

601. New species of brachiopod [*Rhynchotrete williamsi*, Manitoulin Island]: *Canada, Geol. Survey, Mem.* 111, p. 126, 2 figs. on pl. 7, 1919.

602. The generic relations of the American Ordovician Lichadidae: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 26-50, 2 figs., 4 pls., January, 1920.

603. The Kimmswick and Platin limestones of northeastern Missouri: *Denison Univ. Bull., Sci. Lab., Jour.*, vol. 19, pp. 175-224, 3 pls., May, 1920.

604. Racine and Cedarville cystids and blastoids, with notes on other echinoderms: *Ohio Jour. Sci.*, vol. 21, no. 2, pp. 33-78, 4 figs., 4 pls., December, 1920.

605. Presence of upper Silurian sandstone in Essex County, northeastern Massachusetts (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 206-207, March 31, 1920.

606. Intercalation of thecal plates in *Holocystites* in connection with the criteria upon which species can be distinguished (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 207-208, March 31, 1920.

607. Method of appearance of additional arms on increasing age in *Caryocrinites* (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 220-221, March 31, 1920.

See also Miller, no. 1252.

Ford, W. E.

608. New mineral names: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 446-448, June, 1919.

609. New mineral names: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 452-453, June, 1920.

Forrester, J. B.

610. A short comment on Bulletin 371 [Richardson, G. B., Reconnaissance of the Book Cliffs coal field (1909)] of the U. S. Geological Survey: *Utah Acad. Sci., Trans.*, vol. 1, pp. 24-31, February, 1918.

611. A general survey of the Jurassic in southeastern Utah: *Utah Acad. Sci., Trans.*, vol. 1, pp. 33-43, February, 1918.

Foshag, William F.

612. Famous mineral localities; Yuma County, Arizona: *Am. Mineralogist*, vol. 4, no. 12, pp. 149-150, December, 1919.

613. The chemical composition of hydrotalcite and the hydrotalcite group of minerals: *U. S. Nat. Mus., Proc.*, vol. 58, pp. 147-153, 1920.

614. Some recent accessions to the mineral collections of the United States National Museum: *U. S. Nat. Mus., Proc.*, vol. 58, pp. 303-305, 3 pls., 1920.

615. Sulphohalite from Searles Lake, California: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 76-77, January, 1920.

616. Aphthalite (glaserite) from Searles Lake, California: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 367-368, May, 1920.

617. Thaumassite (and spurrite) from Crestmore, California: *Am. Mineralogist*, vol. 5, no. 4, pp. 80-81, April, 1920.

618. Illustration of the hexagonal system; hematite from New Mexico: *Am. Mineralogist*, vol. 5, no. 8, pp. 149-150, 2 figs., August, 1920.

619. Plazolite, a new mineral [from Riverside, California]: *Am. Mineralogist*, vol. 5, no. 11, pp. 183-185, November, 1920.

Foye, Wilbur G.

620. A report of the geological work within the Rochester, Vermont, quadrangle: *Vermont, State Geologist*, 11th Rept., pp. 76-98, 1 pl., 5 figs. [1919].

621. A new occurrence of rhodonite: *Am. Mineralogist*, vol. 4, no. 10, pp. 124-125, October, 1919; [correction] vol. 5, no. 6, p. 120, June, 1920.

Freeman, O. W.

622. Geography and geology of Fergus County [Montana]. *Fergus County High School Bulletin* 2, 71 pp., illus., Lewistown, Montana, 1919.

Friedlaender, Immanuel.

623. Vulkanische Nachrichten über den Ausbruch in San Salvador: *Zeitschr. Vulkanologie*, Bd. 4, H. 4, p. 308, 1 pl., December, 1918.

624. Notizen über die Bogosloff-Inseln: *Zeitschr. Vulkanologie*, Bd. 5, H. 1, pp. 51-55, 1 fig., June, 1919.

Fritel, P. H.

625. Note sur les aralias des flores crétaciques de l'Amérique du Nord et du Groenland: *Soc. Géol. France, Bull.*, 4^e sér., t. 14, pp. 1-22, 13 figs., 1914.

Fuller, Myron L.

626. (and others). Water problems of the Bend series [Texas]; general discussion: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 151-162, 1919.

Fuller, Myron L.—Continued.

627. Quick method of reconnaissance mapping: *Econ. Geology*, vol. 14, no. 5, pp. 411-423, August, 1919.

628. Relation of oil to carbon ratios of Pennsylvania coals in north Texas: *Econ. Geology*, vol. 14, no. 7, pp. 536-542, 1 fig., November, 1919.

629. Carbon ratios in Carboniferous coals of Oklahoma, and their relation to petroleum: *Econ. Geology*, vol. 15, no. 3, pp. 225-235, 1 fig., April-May, 1920.

Gaby, Walter E.

630. The Yerington district, Nevada: *Min. and Sci. Press*, vol. 118, pp. 625-626, May 10, 1919.

Gale, Henry C.

(with Michelson, A. A.). The rigidity of the earth: *Jour. Geology*, vol. 27, no. 8, pp. 585-601, 1 pl., 8 figs., November-December, 1919.

Gale, Hoyt S.

631. (and Hicks, W. B.). Potash in 1917: *U. S. Geol. Survey, Mineral Resources*, 1917, pt. 2, pp. 397-481, 1 fig., March 13, 1919.

632. Saltpeter in Guatemala: *Eng. and Min. Jour.*, vol. 107, pp. 1025-1031, 6 figs., June 14, 1919.

Galloway, J. J.

633. Geology and natural resources of Rutherford County, Tennessee: *Tennessee State Geol. Survey, Bull.* 22, 81 pp., 3 pls., map, 1919.

634. The rounding of grains of sand by solution: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 270-280, 5 figs., April, 1919.

Gálvez, Vicente.

635. Apuntes sobre el mineral de Puerto de Nieto, Estado de Guanajuato: Mexico, *Inst. Geol., Anales* no. 6, pp. 1-9, 1 pl. (map), 1919.

Gannett, R. W.

636. Experiments relating to the enrichment of tungsten ores: *Econ. Geology*, vol. 14, no. 1, pp. 68-78, January-February, 1919.

Garbrecht, Louis.

637. New mining fields in eastern Nicaragua: *Eng. and Min. Jour.*, vol. 109, pp. 791-797, 5 figs., April 3, 1920.

García, J. Aurelio.

(with Paredes, Trinidad). Estudio de la Laguna de Cuyutlán, Estado de Colima [México]: *Boletín Minero*, t. 8, nos. 5-6, pp. 584-597, map, November-December, 1919.

Gardner, H. F.

638. The calcite cave in the New York State Museum: *Am. Mineralogist*, vol. 5, no. 1, pp. 3-5, January, 1920.

Gardner, Julia A.

639. (and Aldrich, T. H.). Mollusca from the upper Miocene of South Carolina with descriptions of new species: *Acad. Nat. Sci. Philadelphia, Proc.*, vol. 71, pt. 1, pp. 17-53, 4 pls., 1919.

Garfias, V. R. See Ordóñez, no. 1356.

Garnett, T. H.

(with Boericke, W. F.). The Wisconsin zinc district: *Am. Inst. Min. and Met. Eng., Bull.* no. 152, pp. 1213-1235, 5 figs., August, 1919; Discussion by G. H. Cox and others, *Mining and Metallurgy*, no. 157, pp. 68-71, January, 1920; *Trans.* vol. 63, pp. 213-243, 5 figs., 1920.

Garrett, Dan L.

640. Stratigraphy and structure of northeastern New Mexico: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 73-82, 2 figs., 1920.

Gauthier, Henri.

641. Road material surveys in the city and district of Montreal, Quebec: Canada, Geol. Survey, Mem. 114, 52 pp., 4 pls., 1 fig., 1 map, 1919.

Gentry, Bruce.

642. The Texas lignite industry: Coal Age, vol. 16, pp. 59-60, 1 fig. (map), July 10, 1919.

George, R. D.

643. (and others). Mineral waters of Colorado: Colorado Geol. Survey, Bull. 11, 474 pp., 40 figs., 2 pls., 1920.

Gerry, C. N.

644. Gold, silver, copper, lead, and zinc in Idaho and Washington in 1917: U. S. Geological Survey, Mineral Resources, 1917, pt. 1, pp. 457-507, April 3, 1919.

645. Gold, silver, copper, lead, and zinc in Montana in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 265-302, February 26, 1920.

646. Gold, silver, copper, lead, and zinc in Idaho and Washington in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 461-511, February 27, 1920.

Gibson, Thomas W.

647. Statistical review of the mineral industry of Ontario for 1918. Ontario Bur. Mines, 28th Ann. Rept., 1919, pp. 1-95, illus., Toronto, 1919.

Gidley, James Williams.

648. Significance of divergence of the first digit in the primitive mammalian foot: Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 273-280, May 19, 1919.

649. Pleistocene peccaries from the Cumberland cave deposit: U. S. Nat. Mus., Proc., vol. 57, pp. 651-678, 2 pls., 13 figs., 1920.

Gilbert, Chester E.

650. (and Pogue, Joseph E.). The mineral resources of the United States; the energy resources of the United States, a field for reconstruction: U. S. Nat. Mus., Bull. 102, vol. 1, 165 pp., 8 pls., 15 figs., 1919.

Gilbert, James Zaccheus.

- (with Jordan, David Starr). Fossil fishes of diatom beds of Lompoc, California: Leland Stanford Junior University Publications, University Series, 44 pp., 29 pls., February, 1920.

Giles, Albert W.

651. Brecciation in the Niagara limestone at Rochester, New York: Am. Jour. Sci., 4th ser., vol. 47, pp. 349-354, 2 figs., May, 1919.

Gill, A. C.

652. Preliminary report on the chromite of Kenai Peninsula, Alaska: U. S. Geol. Survey, Bull. 712, pp. 99-129, 3 pls. (maps), 1919. Abstract by J. D. Sears, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 522, November 4, 1920.

Gilmore, Charles Whitney.

- 653. A new restoration of *Triceratops*, with notes on the osteology of the genus: U. S. Nat. Mus., Proc., vol. 55, pp. 97-112, 7 pls., 6 figs., 1919.
- 654. New fossil turtles, with notes on two described species: U. S. Nat. Mus., Proc., vol. 56, pp. 113-132, 9 pls., 8 figs., 1919.
- 655. A mounted skeleton of *Dimetrodon gigas* in the United States National Museum with notes on the skeletal anatomy: U. S. Nat. Mus., Proc., vol. 56, pp. 525-539, 4 pls., 8 figs., 1919.
- 656. Reptilian faunas of the Torrejon, Puerco, and underlying Upper Cretaceous formations of San Juan County, New Mexico: U. S. Geol. Survey, Prof. Paper 119, 71 pp., 26 pls., 33 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 11, pp. 327-328, June 4, 1920.
- 657. An ornithomimid dinosaur in the Potomac of Maryland: Science, new ser., vol. 50, pp. 394-395, October 24, 1919.
- 658. Osteology of the carnivorous Dinosauria in the United States National Museum, with special reference to the genera *Antrodemus* (*Allosaurus*) and *Ceratosaurs*: U. S. Nat. Mus., Bull. 110, 159 pp., 36 pls., 79 figs., 1920.

Girty, George H.

- 659. The Bend formation and its correlation (with discussion): Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 71-81, 1919.
- 660. (and Moore, Raymond C.). Age of the Bend series [Texas]: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 418-420, 1919.
- 661. Carboniferous and Triassic faunas [of Utah]: U. S. Geol. Survey, Prof. Paper 111, pp. 641-648, 6 pls., 1920.

Gleason, H. A.

- 662. The measurement of postglacial time: Science, new ser., vol. 52, p. 340, October 8, 1920.

Glenn, L. C.

- 663. Oil fields of Kentucky and Tennessee: Mining and Metallurgy, no. 157, sec. 1, p. 51 (abstract), sec. 5, 12 pp., January, 1920; Discussion, no. 159, sec. 2, pp. 18-19, March, 1920; Discussion by Wilbur A. N. Nelson and Stuart St. Clair, Am. Inst. Min. and Met. Eng. [Trans., preprint no. 988], pp. 9-14, 1920.

Glenn, M. L.

- (with Larsen, Esper S.). Some minerals of the melanterite and chalcantite groups with optical data on the hydrous sulphates of manganese and cobalt: Am. Jour. Sci., 4th ser., vol. 50, pp. 225-230, September, 1920.

Goldman, Marcus I.

- 664. General character, mode of occurrence, and origin of glauconite (abstract): Washington Acad. Sci., Jour., vol. 9, no. 16, pp. 501-502, October, 4, 1919.
- 665. Structure and oil and gas resources of the Osage Reservation, Oklahoma: T. 29 N., Rs. 11 and 12 E.: U. S. Geol. Survey, Bull. 686, pp. 329-352, 1 pl. (map), 3 figs., 1920.
- 666. Structure and oil and gas resources of the Osage Reservation, Oklahoma: T. 20, R. 10 E.: U. S. Geol. Survey, Bull. 686, pp. 353-358, 1 pl. (map), 1920.



Goldman, Marcus I.—Continued.

667. (and Robinson, Heath M.). Structure and oil and gas resources of the Osage Reservation, Oklahoma, T. 28 N., Rs. 11 and 12 E.: U. S. Geol. Survey, Bull. 686, pp. 359-394, 4 pls. (incl. maps), 2 figs., 1920.

See also Darton, no. 464; Hancock, no. 744.

Goldthwait, James Walter.

668. Submergence and postglacial uplift in New Hampshire (abstract, with discussion by C. W. Brown): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 112-113, March 31, 1920.
669. Dispersion of stones in the drift in New Hampshire (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 130-131, March 31, 1920.
670. Survey of road materials in New Hampshire (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 154-155, March 31, 1920.

Goodwin, L. H.

671. West Shiningtree gold district, Ontario: Eng. and Min. Jour., vol. 108, pp. 261-264, 4 figs., August 16, 1919.
672. The East Tintic district, Utah: Eng. and Min. Jour., vol. 109, pp. 79-81, 3 figs., January 10, 1920.

Goodwin, W. L.

673. Titaniferous iron ores in Canada: Canadian Min. Inst., Trans., vol. 22, pp. 86-99 [1920].

Gordon, C. H.

674. Barite deposits in upper east Tennessee: Tennessee State Geol. Survey, Bull. 23 (Pt. 1, Ann. Rept. 1919), pp. 65-70, 1920.
675. Notes on the geology of the cove areas of east Tennessee (abstract): Science, new ser., vol. 51, pp. 492-493, May 14, 1920.

Gordon, Samuel G.

676. Two American occurrences of epidiesmine: Am. Mineralogist, vol. 5, no. 9, p. 167, September, 1920.
677. The duferinite locality at Midvale, Rockbridge County, Virginia: Am. Mineralogist, vol. 5, no. 12, pp. 197-198, December, 1920.

Gould, Charles N.

678. Preliminary notes on the geology and structure of the Amarillo region [Texas]: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 269-275, 1920.

Gow, James E.

679. (and Tilton, John L.). Geology of Adair County: Iowa Geol. Survey, vol. 27, pp. 277-344, 3 figs., 1 pl., map [1920].

Grabau, Amadeus W.

680. Migration of geosynclines (abstract): Geol. Soc. America, Bull., vol. 30, p. 87, March 31, 1919.
681. Conditions of deposition of some Tertiary petroliferous sediments (abstract): Geol. Soc. America, Bull., vol. 30, pp. 103-104, March 31, 1919.
682. Prevailing stratigraphic relationships of the bedded phosphate deposits of Europe, north Africa, and North America (abstract): Geol. Soc. America, Bull., vol. 30, p. 104, March 31, 1919.



Grabau, Amadeus W.—Continued.

683. Relation of the Holochoanites and the Orthochoanites to the Protochoanites and the significance of the Bactritidae (abstract, with discussion): Geol. Soc. America, Bull., vol. 30, pp. 148-149, March 31, 1919.
684. Inclusion of the Pleistocene period in the Psychozoic era (abstract, with discussion): Geol. Soc. America, Bull., vol. 30, pp. 149-150, March 31, 1919.
685. Significance of the Sherburne sandstone in upper Devonian stratigraphy: Geol. Soc. America, Bull., vol. 30, no. 4, pp. 423-470, 2 figs., December 31, 1919.
686. Significance of the middle Silurian in American and European geology (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 138, March 31, 1920.
687. Uniclinal; a term proposed for monoclinal ridges of erosion (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 153, March 31, 1920.
688. Geology of the nonmetallic mineral deposits other than silicates; vol. I, Principles of salt deposition. 435 pp., 125 figs., New York, McGraw Hill Book Company, 1920.
689. A textbook of geology. [2 vols.] Part I, General geology; Part II, Historical geology. 864, 976 pp., 1980 figs., Boston, D. C. Heath & Co., 1920-21.
690. Sixty years of Darwinism: Natural History, vol. 20, no. 1, pp. 59-72, 6 figs., January-February, 1920.
691. The Niagara cuesta from a new viewpoint: Geog. Rev., vol. 9, no. 4, pp. 264-276, 17 figs., April-June, 1920.

Graham, R. P. D.

692. On ferrierite, a new zeolitic mineral from British Columbia; with notes on some other Canadian minerals: Roy. Soc. Canada, Trans., 3d ser., vol. 12, sec. 4, pp. 185-201, 1 pl., 5 figs., 1919.

Granger, Walter.

- with Matthew, W. D.). A revision of the lower Eocene Wasatch and Wind River faunas; Part V, Insectivora (continued), Glires, Edentata: Am. Mus. Nat. Hist., Bull., vol. 38, pp. 565-657, 68 figs., 1918.

Gray, F. W.

693. Canada's coal supply: Canadian Min. Inst., Monthly Bull. no. 97, pp. 406-415, May, 1920.
694. Coast erosion of the coal measures in the Sydney coal field, Cape Breton: Canadian Min. Jour., vol. 41, pp. 433-437, 9 figs., May 28, 1920.

Greene, F. C.

695. Oklahoma's stratigraphic problem: Oil and Gas Jour., vol. 18, no. 49, pp. 54 and 56, May 7, 1920.

Greenland, C. W.

696. Note on the optical fluorite from Madoc, Ontario: Am. Mineralogist, vol. 5, no. 12, p. 211, December, 1920.

Greger, Darling K.

697. The Devonian of central Missouri (11): Am. Jour. Sci., 4th ser., vol. 49, pp. 265-266, April, 1920.

Greger, Darling K.—Continued.

698. The Devonian of central Missouri (III); the Cooper limestone: Am. Jour. Sci., 4th ser., vol. 50, pp. 20-24, 1 fig., July, 1920.
 699. North American species of the brachiopod *Etheridgina*: Geol. Mag., vol. 57, pp. 535-538, 1 pl., December, 1920.

Gregory, Herbert E.

700. Professor [Henry Shaler] Williams at Yale: Science, new ser., vol. 49, pp. 63-65, January 17, 1919.
 701. Co-operation in advanced geologic instruction: Am. Jour. Sci., 4th ser., vol. 47, pp. 281-286, April, 1919. Abstract, Geol. Soc. America, Bull., vol. 31, p. 94, March 31, 1919.
 702. Geology in the Students' Army Training Corps (abstract): Geol. Soc. America, Bull., vol. 30, pp. 81-82, March 31, 1919.
 703. Teaching of geology as related to research: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 357-361; September 30, 1920.
 704. Ninth biennial report of the geological and natural history survey of Connecticut: Connecticut State Geol. and Nat. Hist. Survey. Bull. no. 32, 18 pp., 1920.

Gregory, William K.

705. The evolution of the human face: Natural History, vol. 19, nos. 4-5, pp. 421-425, 9 figs., April-May, 1919.
 706. On the structure and relationships of *Notharctus*, an American Eocene primate: Am. Mus. Nat. Hist., Mem., new ser., vol. 3, pt. 2, pp. 49-243, 84 figs., 37 pls., September, 1920.
 707. Studies in comparative myology and osteology, No. IV; A review of the evolution of the lachrymal bone of vertebrates with special reference to that of mammals: Am. Mus. Nat. Hist., Bull., vol. 42, pp. 95-263, 194 figs., 1 pl., 1920.
 708. Studies in comparative myology and osteology, No. V; On the anatomy of the preorbital fossæ of Equidæ and other ungulates: Am. Mus. Nat. Hist., Bull., vol. 42, pp. 265-283, 25 figs., 1 pl., 1920.
 709. Restoration of *Camarasaurus* and life model: Nat. Acad. Sci., Proc., vol. 6, no. 1, pp. 16-17, January 15, 1920.

Gregory, Winifred.

710. Supplement to the bibliography of Minnesota mining and geology: Minnesota, Univ., School of Mines Exp. Station, Bull. no. 8, 43 pp., November 24, 1920.

Griggs, Robert F.

711. The character of the eruption [of Katmai] as indicated by its effects on nearby vegetation: Ohio Jour. Sci., vol. 19, no. 3, pp. 173-209, 19 figs., January, 1919.
 712. The Katmai National Monument and the Valley of Ten Thousand Smokes: Science, new ser., vol. 49, pp. 236-237, March 7, 1919.
 713. The great Mageik landslide [Katmai district, Alaska]: Ohio Jour. Sci., vol. 20, no. 8, pp. 325-354, 17 figs., June, 1920.

Grout, Frank F.

714. Clays and shales of Minnesota; with contributions by E. K. Soper: U. S. Geol. Survey, Bull. 678, 259 pp., 16 pls., 38 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 19, p. 600, November 19, 1919.

Grout, Frank F.—Continued.

715. (and Soper, E. K.). *Geology of Minnesota*; U. S. Geol. Survey, Bull. 678, pp. 70–105, 2 pls. (incl. map), 3 figs., 1919.

716. (and Broderick, T. M.). The magnetite deposits of the eastern Mesabi range, Minnesota: Minnesota Geol. Survey, Bull. no. 17, 58 pp., 18 pls. (incl. maps), 9 figs., 1919.

717. (and Broderick, T. M.). Organic structures in the Biwabik iron-bearing formation of the Huronian in Minnesota: Am. Jour. Sci., 4th ser., vol. 48, pp. 199–205, 4 figs., September, 1919.

718. The nature and origin of the Biwabik iron-bearing formation of the Mesabi range, Minnesota: Econ. Geology, vol. 14, no. 6, pp. 452–464, 2 pls., 1 fig., September–October, 1919.

719. Movements in crystallizing magma: Jour. Geology, vol. 28, no. 3, pp. 255–264, April–May, 1920.

Gruner, John W.

720. Geologic reconnaissance of the southern part of the Taos Range, New Mexico: Jour. Geology, vol. 28, no. 8, pp. 731–742, 1 pl. (map), 4 figs., November–December, 1920.

Guck, Homer.

721. *Geology of the Michigan copper district*: Eng. and Min. Jour., vol. 108, pp. 948–949, December 27, 1919.

Guild, F. N.

722. Flagstaffite, a new mineral from Arizona: Am. Mineralogist, vol. 5, no. 10, pp. 169–172, 2 figs., October, 1920.

Guppy, H. B.

723. Fossil botany in the western world; an appreciation: Am. Jour. Sci., 4th ser., vol. 49, pp. 372–374, May, 1920.

Haack, Wilhelm.

724. Ueber eine marine Permfauna aus Nordmexiko nebst Bemerkungen über Devon daselbst: Deutsche geol. Gesell., Zeitschr., Bd. 66, H. 4, pp. 482–504, 2 figs., 2 pls., 1914.

Haanel, Eugene.

725. Summary report of the Mines Branch of the Department of Mines [of Canada] for the calendar year ending December 31, 1918. 225 pp., 6 figs., Ottawa, 1920.

726. Summary report of the Mines Branch of the Department of Mines [of Canada] for the calendar year ending December 31, 1919. 182 pp., 2 figs., Ottawa, 1920.

Haas, W. H.

727. Erosion features of the Mesa Verde [Colorado]: Illinois Acad. Sci., Trans., vol. 9, pp. 211–219 [1917].

Hackford, J. E.

728. Nature of coal: Mining and Metallurgy, no. 163, pp. 35–36, July, 1920 (abstract); Am. Inst. Min. and Met. Eng., Trans. [preprint no. 1001], 6 pp., 1920; discussion by W. E. Pratt, David White, E. De Golyer, Reinhardt Thiessen, and C. E. Waters [preprint] no. 1038, pp. 63–68, January, 1921.

Hager, Dorsey.

729. Practical oil geology; the application of geology to oil field problems. Third edition, 253 pp., 126 figs., New York, McGraw-Hill Book Company, 1919.

730. Geology of oil fields of north central Texas (with discussion by W. E. Pratt): Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 520-531, 8 figs., 1920.

Hager, Lee. See Brokaw, no. 201.

Haley, D. F.

731. Molybdenite operations at Climax, Colorado; Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 71-76, 1920.

Haliburton, E. D.

732. Newfoundland's coal areas: Canadian Min. Jour., vol. 40, no. 50, pp. 946-947, 1 fig., December 17, 1919.

Hancock, E. T.

733. Geology and oil and gas prospects of the Lake Basin field, Montana (U. S. Geol. Survey, Bull. 691, pp. 101-147, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 2, p. 50, January 19, 1919.

734. Geology and oil and gas prospects of the Huntley field, Montana: U. S. Geol. Survey, Bull. 711, pp. 105-148, 5 pls. (incl. map), 2 figs., 1920. Abstract by J. D. Sears, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 521, November 4, 1920.

735. The Upton-Thornton oil field, Wyoming: U. S. Geol. Survey, Bull. 716, pp. 17-34, 1 pl. (map), 1 fig., 1920. Abstract by M. I. Goldman, Washington Acad. Sci., Jour., vol. 10, no. 18, pp. 522-523, November 4, 1920.

736. The Mule Creek oil field, Wyoming: U. S. Geol. Survey, Bull. 716, pp. 35-53, 1 fig., 1 pl. (map), July 27, 1920. Abstract by M. I. Goldman, Washington Acad. Sci., Jour., vol. 10, no. 21, p. 598, December 19, 1920.

737. The Lance Creek oil and gas field, Niobrara County, Wyoming: U. S. Geol. Survey, Bull. 716, pp. 91-122, 4 pls. (incl. map), December 13, 1920.

Handy, F. M.

738. Stevens County magnesite [Washington]. In Northwest Mines Handbook, vol. 1, pp. 315-318, 1 fig., published by Sidney Norman, Spokane, Washington, 1918.

Haney, Marshall.

739. The tin deposits of Virginia, U. S. A.: Canadian Min. Jour., vol. 41, p. 801, October 1, 1920.

740. The mining of paint; yellow ocher deposits of the Cartersville district, Georgia: Eng. and Min. Jour., vol. 110, no. 18, pp. 859-860, 2 figs., October 30, 1920.

Hanna, G. Dallas.

741. Geological notes on the Pribilof Islands, Alaska, with an account of the fossil diatoms: Am. Jour. Sci., 4th ser., vol. 48, pp. 216-224, September, 1919.

742. Fossil mollusks from the John Day Basin in Oregon: Oregon, Univ., Pub., vol. 1, no. 6, 8 pp., 1 pl., August, 1920.

743. [Report of] Department of Invertebrate Paleontology: California Acad. Sci., Proc., 4th ser., vol. 9, nos. 14 and 15, pp. 387-389, 1920.

Hanson, George.

744. Some Canadian occurrences of pyritic deposits in metamorphic rocks: Econ. Geology, vol. 15, no. 7, pp. 574-609, 2 pls., 3 figs., November, 1920.

Harder, Edmund Cecil.

745. Iron-depositing bacteria and their geologic relations: U. S. Geol. Survey, Prof. Paper 113, 89 pp., 12 pls., 14 figs., 1919.
746. (and Hewett, D. F.). Recent studies of domestic manganese deposits: Am. Inst. Min. and Met. Eng., Trans., vol. 63, pp. 3-50, 1920; (abstract), Bull. no. 149, pp. 895-901, May, 1919.
747. Bacteria and iron deposition: Pahasapa Quart., vol. 9, no. 3, pp. 105-112, 2 figs., April, 1920.
748. (and Eddingfield, F. T.). The iron ores of the world: Eng. and Min. Jour., vol. 109, pp. 1060-1064, May 8, 1920.
- See also Allen, R. C., no. 25.

Harnsberger, T. K.

749. The geology and coal resources of the coal-bearing portion of Tazewell County, Virginia: Virginia Geol. Survey, Bull. no. 19, 195 pp., 14 pls. (incl. maps), 17 figs., 1919.

Harper, Roland M.

750. Resources of southern Alabama: Alabama, Geol. Survey, Special Rept. no. 11, 152 pp., 28 figs., July, 1920.

Harrington, George L.

751. The Anvik-Andreafski region, Alaska (including the Marshall district): U. S. Geol. Survey, Bull. 683, 70 pp., 7 pls. (incl. maps), 1918. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 19, pp. 600-601, November 19, 1919.
752. The gold and platinum placers of the Tolstoi district [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 339-351, 1 pl. (map), 1919. Abstract by G. C. Martin, Washington Acad. Sci. Jour., vol. 9, no. 20, p. 636, December 4, 1919.
753. Tin mining in Seward Peninsula: U. S. Geol. Survey, Bull. 692, pp. 353-363, 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 636, December 4, 1919.
754. Graphite mining in Seward Peninsula: U. S. Geol. Survey, Bull. 692, pp. 363-367, 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 636, December 4, 1919.
755. The gold and platinum placers of the Kiwalik-Koyuk region [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 369-400, 1 pl. (map), 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 636, December 4, 1919.

Harris, Gilbert D.

756. Pelecypoda of the St. Maurice and Claiborne stages: Bull. Am. Paleont., vol. 6, no. 31, 260 pp., 59 pls., June 30, 1919.
757. The genera *Lutetia* and *Alveinus*, especially as developed in America: Palaeontographica Americana, vol. 1, no. 2, pp. 105-118, 1 pl., 8 figs., Ithaca, Harris Company, 1920.
- (with Van Winkle, Katherine). New or otherwise interesting Tertiary molluscan species from the east coast of America: Bull. American Paleontology, vol. 8, no. 33, pp. 1-32, 3 pls., March 6, 1919.

Harrison, John Burchmore.

758. Notes on the extraneous minerals in the coral limestones of Barbados (abstract): *Geol. Mag.*, new ser., dec. 6, vol. 6, p. 382, August, 1919.

759. The genesis of a fertile soil [Barbados]: *West Indian Bull.*, vol. 18, no. 3, pp. 77-98 [1920].

760. Note on the occurrence of rhyolitic pebbles in Antigua: *West Indian Bull.*, vol. 18, no. 3, pp. 99-101 [1920].

Harrison & Eaton [firm].

761. Report on investigation of oil and gas possibilities of western Oregon: *Oregon Bur. Mines and Geology, Min. Res. Oregon*, vol. 3, no. 1, pp. 3-37, 5 pls. (relief maps and sections), March, 1920.

Harvey, Ruth Sawyer.

762. Drainage modifications and glaciation in the Danbury region, Connecticut: *Connecticut, State Geol. and Nat. Hist. Survey, Bull.* no. 30, 59 pp., 5 pls., 10 figs., 1920.

Hawaiian Volcano Observatory.

763. Weekly (after no. 1, Monthly) Bulletin, Vol. 7, nos. 1-12, January-December, 1919. Vol. 8, nos. 1-12, January-December, 1920. Honolulu, Hawaii, 1919-20.

Hay, Oliver P.

764. Descriptions of some mammalian and fish remains from Florida of probably Pleistocene age: *U. S. Nat. Mus., Proc.*, vol. 56, pp. 103-112, 3 pls., 1919.

765. [On Pleistocene geology and vertebrate paleontology of the Atlantic Coastal Plain]: *Carnegie Inst. Washington, Year Book* no. 17, 1918, pp. 311-312, February, 1919.

766. On some proboscideans of the State of New York: *Science*, new ser., vol. 49, pp. 377-379, April 18, 1919.

767. On the relative ages of certain Pleistocene deposits: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 361-375, May, 1919.

768. Descriptions of some Pleistocene vertebrates found in the United States: *U. S. Nat. Mus., Proc.*, vol. 58, pp. 83-146, 9 pls., 4 figs., 1920.

769. [On Pleistocene vertebrates and Pleistocene geology]: *Carnegie Inst. Washington, Year Book* no. 18, 1919, pp. 361-362, March, 1920.

Hayes, Albert O.

770. Investigations in Nova Scotia: *Canada, Geol. Survey, Summ. Rept.*, 1917, pt. F, pp. 20-32, 1918.

771. Investigations in Nova Scotia and New Brunswick: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. F, pp. 5-31, 3 figs., 1919.

772. The Malagash salt deposit, Cumberland County, Nova Scotia: *Canada, Geol. Survey, Mem.* 121, 24 pp., 1 fig., 2 maps, 1920.

773. Investigations in Nova Scotia and New Brunswick: *Canada, Geol. Survey, Summ. Rept.*, 1919, pt. F, pp. 20-22, 1920.

774. Nova Scotian oolitic iron deposits of sedimentary origin: *Canadian Min. Inst., Trans.*, vol. 22, pp. 112-122 [1920].

775. Carboniferous salt and potash deposits of eastern Canada (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 155, March 31, 1920.

Haynes, Winthrop P.

(with Moore, Raymond C.). An outcrop of basic igneous rock in Kansas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 2, pp. 183-187, 1920.

Headden, Wm. P.

776. A contribution to the hydrology of the San Luis Valley, Colorado: Colorado Sci. Soc., Proc., vol. 11, pp. 223-238, June, 1919.

Heald, K. C.

777. Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 25 N., R. 9 E.: U. S. Geol. Survey, Bull. 686, pp. 27-41, 5 figs., 1 pl. (map), 1918.
778. (and Bowen, C. F., and others). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 24 N., R. 9 E.: U. S. Geol. Survey, Bull. 686, pp. 193-212, 2 pls. (incl. map), 3 figs., 1919.
779. Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 27 N., R. 8 E.: U. S. Geol. Survey, Bull. 686, pp. 213-222, 2 pls. (incl. map), 5 figs., 1919.
780. (and Mather, Kirtley F.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 26 N., R. 8 E.: U. S. Geol. Survey, Bull. 686, pp. 223-236, 1 pl. (map), 2 figs., 1919.

See also Bosworth, no. 169.

Heikes, V. C.

781. Gold, silver, copper, lead, and zinc in Utah in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 167-202, February 8, 1919.
782. Gold, silver, copper, lead, and zinc in Nevada in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 253-298, February 18, 1919.
783. Gold, silver, copper, lead, and zinc in Montana in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 331-366, February 21, 1919.
784. Gold, silver, copper, lead, and zinc in Arizona in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 509-548, April 1, 1919.
785. Gold, silver, copper, lead, and zinc in Nevada in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 217-264, January 27, 1920.
786. Gold, silver, copper, lead, and zinc in Arizona in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 329-368, February 20, 1920.
787. Gold, silver, copper, lead, and zinc in Utah in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 369-403, March 4, 1920.

See also Butler, no. 255.

Henderson, Charles W.

788. Gold, silver, copper, and lead in South Dakota and Wyoming in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 153-165, January 27, 1919.
789. Gold, silver, copper, lead, and zinc in New Mexico and Texas in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 697-722, November 8, 1919.
790. Gold, silver, copper, lead, and zinc in Colorado in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 797-853, March 1, 1920.
791. Gold, silver, copper, and lead in South Dakota and Wyoming in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 183-192, November 6, 1919.
792. Gold, silver, copper, lead, and zinc in New Mexico and Texas in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 303-328, February 19, 1920.
793. Gold, silver, copper, lead, and zinc in Colorado in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 819-875, September 2, 1920.

Henderson, Junius.

794. The Cretaceous formations of the northeastern Colorado plains: Colorado Geol. Survey, Bull. 19, pp. 7-57, 1920.

Henderson, Junius—Continued.

- 795. The foothills formations of north central Colorado: Colorado Geol. Survey, Bull. 19, pp. 58-96, 11 figs., 1 pl. (map), 1920.
- 796. The nomenclature and systematic positions of some North American fossils and recent mollusks: *Nautilus*, vol. 33, no. 4, pp. 118-122, April, 1920.

Hennen, Ray V.

- 797. Fayette County. West Virginia Geol. Survey, 1002 pp., 24 pls. 23 figs., 2 maps in atlas, 1919.

Henning, John L.

- 798. Sulphur mining (with discussion): Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 241-252, 1919.

Hess, Frank L.

- 799. Tactite, the product of contact metamorphism: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 377-378, November, 1918.
- 800. Cobalt, molybdenum, nickel, titanium, tungsten, radium, uranium, and vanadium in 1916: U. S. Geol. Survey, Mineral Resources, 1916, pt. 1, pp. 775-807, February 25, 1919.
- 801. The tungsten resources of the world: *Eng. and Min. Jour.*, vol. 108, pp. 715-722, 1 fig., November 1, 1919.
- 802. Phenocrysts in granitic intrusions (abstract): *Washington Acad. Sci. Jour.*, vol. 9, no. 10, pp. 294-295, May 19, 1919.
- 803. [Note on cobalt-bearing veins, Lemhi County, Idaho] (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 16, p. 501, October 4, 1919.
- 804. (and Wells, Roger C.). Brannerite, a new uranium mineral [Stanley Basin, central Idaho]: *Franklin Inst., Jour.*, vol. 189, no. 2, pp. 225-237, 2 figs., February, 1920; no. 6, pp. 779-780, June, 1920.
- 805. Cobalt, molybdenum, nickel, titanium, tungsten, radium, uranium, and vanadium in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 899-959, August 31, 1920.
- 806. Cobalt, molybdenum, tantalum, titanium, radium, uranium, and vanadium in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 791-817, 1 fig., June 29, 1920.
- 807. Nickel in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 783-790, June 29, 1920.

Hewett, D. F.

- 808. Manganese ore as a war mineral (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 97-98, March 31, 1919.
- 809. [Manganese deposits] (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 13, pp. 386-387, July 19, 1919.
- 810. Manganese and manganiferous ores in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 665-696, 1 fig., October 31, 1919.
- 811. The Heart Mountain overthrust, Wyoming: *Jour. Geology*, vol. 28, no. 6, pp. 536-557, 4 figs. (incl. map), September-October, 1920. Abstract, *Washington Acad. Sci., Jour.*, vol. 10, no. 2, p. 51, January 19, 1920; *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 122, March 31, 1920.
- 812. Manganese and manganiferous ores in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 607-656, 1 fig., 1 pl., April 10, 1920.

Hewett, D. F.—Continued.

813. Measurements of folded beds: *Econ. Geology*, vol. 15, no. 5, pp. 367–385, 6 figs., July–August, 1920.
 (with Stose, G. W., and others). Manganese deposits of the west foot of the Blue Ridge, Virginia: *Virginia Geol. Survey, Bull.* no. 17, 166 pp., 22 pls. (incl. maps), 16 figs., 1919.
 (with Harder, E. C.). Recent studies of domestic manganese deposits: *Am. Inst. Min. and Met. Eng., Trans.*, vol. 63, pp. 3–50, 1920; (abstract, *Bull.* no. 149, pp. 895–901, May, 1919).

Hibbard, F. N.

814. A new seismograph at Chicago: *Seismol. Soc. America, Bull.*, vol. 9, no. 2, pp. 42–44, 2 figs., June, 1919.

Hibbs, G. Gillingham.

815. Boulder County [Colorado] fluorspar: *Eng. and Min. Jour.*, vol. 109, pp. 494–495, February 21, 1920.

Hice, Richard R.

816. The white clay possibilities of Pennsylvania: *Am. Ceramic Soc., Jour.*, vol. 2, no. 9, pp. 685–694, 1 pl., September, 1919.

Hicks, W. B.

817. Potash in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 2, pp. 385–445, March 31, 1920.
 818. (and Nourse, M. R.). Potash in 1919: *U. S. Geol. Survey, Mineral Resources*, 1919, pt. 2, pp. 77–94, December 8, 1920.
 (with Gale, H. S.). Potash in 1917: *U. S. Geol. Survey, Mineral Resources*, 1917, pt. 2, pp. 397–481, 1 fig., March 13, 1919.

Hill, James M.

819. The platinum situation: *Eng. and Min. Jour.*, vol. 108, pp. 131–137, 4 figs., July 26, 1919.
 820. Arsenic, bismuth, selenium, and tellurium in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 1, pp. 193–199, November 19, 1919.
 821. Platinum and allied metals in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 1, pp. 201–209, December 8, 1919.
 822. Gold, silver, copper, lead, and zinc in the Eastern States in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 1, pp. 211–215, January 26, 1920.
 823. Platinum and allied metals in 1919: *U. S. Geol. Survey, Mineral Resources*, 1919, pt. 1, pp. 9–18, July 30, 1920.
 824. Arsenic, bismuth, selenium, and tellurium in 1919: *U. S. Geological Survey, Mineral Resources*, 1919, pt. 1, pp. 19–27, September 16, 1920.
 825. Bauxite and aluminum in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 1, pp. 513–526, 1 fig., 2 pls., March 16, 1920.
 826. Bauxite and aluminum in 1919: *U. S. Geol. Survey, Mineral Resources*, 1919, pt. 1, pp. 33–40, August 30, 1920.
 827. Tin; its political and commercial control: *Eng. and Min. Jour.*, vol. 109, pp. 1011–1020, 2 figs., May 1, 1920.

Hill, Robert T.

828. The Gulf coast salt domes: *Econ. Geology*, vol. 14, no. 8, pp. 643–644, December, 1919.
 829. The rifts of southern California: *Seismol. Soc. America, Bull.*, vol. 10, no. 3, pp. 146–149, September, 1920.

Hillebrand, W. F.

830. The analysis of silicate and carbonate rocks (a revised and enlarged edition of Bull. 422): U. S. Geol. Survey, Bull. 700, 285 pp., 23 figs., 1919.

Hills, T. M.

831. Some estimates of the thickness of the sedimentary rocks of Ohio: Jour. Geology, vol. 28, no. 1, pp. 84-86, January-February, 1920.

Hinds, Henry.

832. Description of the Colchester and Macomb quadrangles, Illinois: U. S. Geol. Survey, Geol. Atlas, Colchester-Macomb folio, no. 208, 14 pp., 14 figs., 4 maps, 1919.

Hippard, C. W.

833. Résumé of the theory of the origin of coal: Coal Age, vol. 16, pp. 104-107, July 17, 1919.

Hixon, H. W. See Johnson, no. 939; White, no. 2004; and Willis, no. 2047.

Hobbs, William Herbert.

834. The peculiar weathering process of desert regions with illustrations from Egypt and the Soudan: Michigan Acad. Sci., 20th Ann. Rept., pp. 93-99, 8 pls., 1918.

835. Calcination volcanoes (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 115, March 31, 1920.

836. Extremes of mountain-glacier erosion (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 130, March 31, 1920.

See also Woodworth, no. 2037.

Hodge, Edwin T.

837. The geology of the Coamo-Guayama district, Porto Rico: Scientific Survey of Porto Rico and the Virgin Islands, vol. 1, pt. 2, pp. 111-228, 50 figs., map, New York Acad. Sci., 1920.

Hodge, James M.

838. Coals of Middle Fork of Kentucky River in Leslie and Harlan counties: Kentucky Geol. Survey, 166 pp., 1918.

839. Coals of the north fork of Kentucky River in Perry and portions of Breathitt and Knott counties [Kentucky]: Kentucky Geol. Survey, Fourth ser., vol. 3, pt. 3, 418 pp., 5 maps, 1918.

840. The coals of Goose Creek and its tributaries [Clay County]: Kentucky Geol. Survey, Fourth series, vol. 4, pt. 3, pp. 1-183, 1918.

Holbrook, E. A.

841. (and Nelson, Wilbur A.). The coal pyrite resources of Tennessee and tests on their availability: Tennessee State Geol. Survey, Resources of Tennessee, vol. 9, no. 1, pp. 60-70, January, 1919. Coal Age, vol. 15, pp. 1077-1079, June 12, 1919.

Holden, Edwin F.

842. Limonite pseudomorphous after pyrite from York County, Pennsylvania: Am. Mineralogist, vol. 4, no. 6, pp. 68-69, June, 1919.

843. An American occurrence of sarcopside [Deering, New Hampshire]: Am. Mineralogist, vol. 5, no. 5, pp. 99-102, May, 1920.

844. A calcium phosphate with ratios between those of triplite and sarcopside: Am. Mineralogist, vol. 5, no. 9, p. 166, September, 1920.

Holden, R. J.

845. Notes on the Oriskany and Helderberg in Virginia (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 137, March 31, 1920.

Hole, Allen D.

846. Preliminary report on the molding sands of Indiana: Indiana, Year Book 1918, pp. 196-207, 1919.

847. Notes on the paleontology of certain Chester formations in southern Indiana: Indiana Acad. Sci., Proc. 1918, pp. 183-185, 1919.

Holland, W. J.

848. Charles Rochester Eastman: Carnegie Mus., Annals, vol. 12, nos. 2-4, pp. 346-352, part., October, 1919.

Hollick, Arthur.

849. Some botanical problems that paleobotany has helped to solve: Brooklyn Botanic Garden, Mem., vol. 1, pp. 187-190, July 6, 1918.

Holtedah, Olaf.

850. Summary of geological results. Second Norwegian Arctic Expedition in the *Fram* 1898-1902, Rept. No. 36, 27 pp., 6 pls., 4 figs., map, Videnskabs-Selskabet i Kristiania, 1917.

851. Paleogeography and diastrophism in the Atlantic-Arctic region during Paleozoic time: Am. Jour. Sci., 4th ser., vol. 49, pp. 1-25, 12 figs., January, 1920.

Holtz, H. C.

(with Howe, James Lewis). Bibliography of the metals of the platinum group; platinum, palladium, iridium, rhodium, osmium, ruthenium, 1748-1917: U. S. Geol. Survey, Bull. 694, 558 pp., 1919. Abstract, by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 10, p. 301, May 19, 1920.

Honess, Charles W.

852. Structural features of the southern Ouachita Mountains, Oklahoma (abstract with discussion by H. D. Miser): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 121-122, March 31, 1920.

Hoover, Herbert C.

853. Some notes on crossings [North Star mine, Grass Valley, California]: Min. and Sci. Press, vol. 120, pp. 743-744, 5 figs., May 22, 1920 (reprinted from vol. 72, pp. 166-167, February 29, 1896).

Hopkins, Oliver B.

854. (and Powers, Sidney). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 24 N., R. 11 and 12 E.: U. S. Geol. Survey, Bull. 686, pp. 237-253, 4 pls. (incl. map), 1919.

Hopkins, Percy E.

855. Larder Lake gold area: Ontario Bur. Mines, 28th Ann. Rept., vol. 28, pt. 2, pp. 71-77, 3 figs., 1919. Canadian Min. Jour., vol. 40, pp. 68-71, 3 figs., February 5, 1919.

856. West Shiningtree gold area: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 3, pp. 28-52, 16 figs., map, 1920. Reprinted as Bull. 39, 26 pp., 1920.

(with Knight, C. W., and others). Abitibi-Night Hawk gold area, District of Timiskaming: Ontario Bur. Mines, 28th Ann. Rept., vol. 28, pt. 2, pp. 1-70, 50 figs., map, 1919.

(with Burrows, A. C.). Kirk and Lake gold area (second report): Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 4, 53 pp., illus., 2 maps, 1920.

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Hore, Reginald E.

- 857. The Wasapika gold area [Sudbury district, Ontario]: Canadian Min. Jour., vol. 40, pp. 490-501, 30 figs., July 9, 1919.
- 858. The Huntingdon copper mine [Eastman], Quebec: Canadian Min. Jour., vol. 40, pp. 582-584, 4 figs., August 6, 1919.
- 859. Recent developments in Wasapika gold area [Sudbury district, Ontario]: Canadian Min. Jour., vol. 40, pp. 677-678, September 10, 1919.
- 860. Some notes on ores and rocks of Wasapika gold area [Sudbury district, Ontario]: Canadian Min. Jour., vol. 40, pp. 749-750, October 7, 1919.
- 861. A new gold field in Ontario [Wasapika area, Sudbury mining division]: Min. and Sci. Press, vol. 119, pp. 595-596, 1 fig., October 25, 1919.
- 862. The pitchblende deposit in Butte township, Nipissing district, Ontario: Canadian Min. Jour., vol. 40, pp. 830-831, 4 figs., November 5, 1919.
- 863. Country rocks of Elliott pitchblende deposits [Butte township, Ontario]: Canadian Min. Jour., vol. 40, no. 50, p. 948, December 17, 1919.

Hoskin, Arthur J.

- 864. The winning of oil from rocks: Min. and Sci. Press, vol. 118, pp. 701-707, 10 figs., May 24, 1919.

Hostetter, J. C.

- (with Merwin, H. E.). Hematite and rutile formed by the action of chlorine at high temperatures: Am. Mineralogist, vol. 4, no. 10, pp. 126-127, 1 fig., October 1919.

Hotchkiss, W. O.

- 865. Geology of the Gogebic Range and its relation to recent mining developments: Eng. and Min. Jour., vol. 108, pp. 443-452, 501-507, 537-541, 577-582, 35 figs., September 13, 20, and 27 and October 4, 1919.
- 866. Report of the director of the survey: Twelfth biennial report of the Commissioners of the Geological and Natural History Survey, covering the period from July 1, 1918, to June 30, 1920. 37 pp., 2 figs., Madison, Wisconsin, 1920.
- 867. Exploration methods on the Gogebic Range: Mining and Metallurgy, no. 163, pp. 29-30, July, 1920 (abstract). Am. Inst. Min. and Met. Eng., Trans. [preprint no. 995], 7 pp. [1920].

See also Allen, R. C., no. 25.

Hough, George A.

- 868. Notes on an unlisted mineral [cocinerite, Ramos, San Luis Potosi, Mexico]: Am. Jour. Sci., 4th ser., vol. 48, p. 206, September, 1919.

Hovey, Edmund Otis.

- 869. Proceedings of the thirty-first annual meeting of the Geological Society of America, held at Baltimore, Maryland, December 27 and 28, 1918: Geol. Soc. America, Bull., vol. 30, pp. 1-142, 6 pls., March 31, 1919.
- 870. Proceedings of the thirty-second annual meeting of the Geological Society of America, held at Boston, Massachusetts, December 29-31, 1919: Geol. Soc. America, Bull., vol. 31, pp. 1-176, 7 pls., March 31, 1920.

Howe, James Lewis.

- 871. (and Holtz, H. C.). Bibliography of the metals of the platinum group; platinum, palladium, iridium, rhodium, osmium, ruthenium, 1748-1917: U. S. Geol. Survey, Bull. 694, 558 pp., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 10, p. 301, May 19, 1920.

Howe, Marshall A.

872. Tertiary calcareous Algae from the islands of St. Bartholomew, Antigua, and Anguilla: Carnegie Inst. Washington, Pub. no. 291, pp. 9-19, 6 pls., 1919.

Howell, B. F.

873. Correlation of the middle Cambrian of Newfoundland and Great Britain (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 214, March 31, 1920.

Howell, J. V.

874. Twin Lakes district of Colorado [Lake and Pitkin counties]: Colorado Geol. Survey, Bull. 17, 108 pp., 27 figs., 2 pls. (maps), 1919.

Hrdlička, Aleš.

875. Recent discoveries attributed to early man in America: Bur. Am. Ethnology, Bull. 66, 67 pp., 14 pls., 8 figs., 1918. [Includes an account of the Vero, Fla., remains.]

Hubbard, Bela.

876. Tertiary Mollusca from the Lares district, Porto Rico: New York Acad. Sci., Scientific Survey of Porto Rico and the Virgin Islands, vol. 3, pt. 2, pp. 79-164, 16 pls., 1920.

877. The Tertiary formations of Porto Rico: Science, new ser., vol. 51, pp. 395-396, April 16, 1920. Abstract, Geol. Soc. America, Bull., vol. 31, no. 1, p. 135, March 31, 1920.

(with Fettke, Charles R.). Limonite deposits of Mayaguez Mesa, Porto Rico: Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 97-112, 8 figs., 1920.

Huerta, Santiago de la.

- (with Ortega, Pablo). El carbón de piedra, el petróleo, el asfalto, los betunes, y el gas natural de Cuba: Cuba, Dirección de Montes y Minas, Bol. Bibliog. no. 1, 23 pp., La Habana, 1919.

Hull, J. P. D.

878. (and La Forge, Laurence, and Crane, W. R.). Report on the manganese deposits of Georgia: Georgia Geol. Survey, Bull. no. 35, 295 pp., 11 pls., 26 figs., 2 maps, Atlanta, 1919.

879. (and Teas, L. P.). A preliminary report on the oil prospect near Scotland, Telfair County, Georgia: Georgia Geol. Survey, 23 pp., 4 figs., map, 1919.

880. Report on the barytes deposits of Georgia: Georgia Geol. Survey, Bull. no. 36, 146 pp., 11 pls., 17 figs., 4 maps, 1920.

Hume, George S.

881. The stratigraphy and geologic relations of the Paleozoic outlier of Lake Timiskaming: Am. Jour. Sci., 4th ser., vol. 50, pp. 293-309, 2 figs., (incl. map), October, 1920.

Humphreys, W. J.

882. Seismological reports [monthly]; Monthly Weather Review, vol. 47, 1919; vol. 48, 1920.

883. Earthquakes felt in the United States during 1919: Monthly Weather Review, vol. 47, p. 911, December, 1919.

Hunt, Walter Fred.

- (with Kraus, Edward Henry). Mineralogy; an introduction to the study of minerals and crystals. xiv, 561 pp., 696 figs., New York. McGraw-Hill Book Company, 1920.

Huntley, Stirling.

- (with Johnson, Roswell H.). A résumé of the Pennsylvania-New York oil field: Mining and Metallurgy, no. 158, sec. 1, p. 32 (abstract), sec. 23, 4 pp., February, 1920.

Hussakof, L.

884. (and Bryant, W. L.). Catalog of the fossil fishes in the museum of the Buffalo Society of Natural Sciences: Buffalo Soc. Nat. Sci., Bull., vol. 12, 346 pp., 70 pls., 64 figs., 1918.

Iddings, Joseph P.

885. Igneous rocks; composition, texture and classification, description and occurrence. In two volumes. Vol. 1 (second edition, revised), 465 pp., 3 pls., 22 figs., New York, John Wiley & Sons, 1920.
886. Relative densities of igneous rocks calculated from their norms: Am. Jour. Sci. 4th ser., vol. 49, pp. 363-366, May, 1920.
887. Louis Valentine Pirsson: Science, new ser., vol. 51, pp. 530-532, May 28, 1920.

Iglesias, Carlos A.

888. Ensayo para determinar la extensión total probable del área que se puede considerar como petrolífera en la República, así como de las porciones ya exploradas [petroleum areas of Mexico]: Bol. del Petróleo, vol. 5, no. 4, pp. 333-335, map, April, 1918.

Ingalls, W. R.

889. Rossiter W. Raymond: Eng. and Min. Jour., vol. 107, pp. 135-142, 4 figs. (incl. port.), Jan. 18, 1919.

Insley, Herbert.

890. Lithium minerals in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 2, pp. 37-40, August 12, 1920.

Institute for Government Research.

891. Service monographs of the United States Government, No. 1. The U. S. Geological Survey; its history, activities, and organization. 163 pp., 2 maps, New York, D. Appleton and Company, 1918.

Jackson, Robert Tracy.

892. Value and use of stages in development in teaching paleontology: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 395-399, September 30, 1920.

Jacobs, E. C.

893. The lime industry in Vermont: Vermont, State Geologist, 11th Rept., pp. 158-164 [1919].

Jaekel, Otto.

894. Phylogenie und System der Pelmatozoen: Palaeontologische Zeitschr., Bd. 3, H. 1, pp. 1-128, 114 figs., October, 1918.

Jaggard, T. A.

895. [Observations on Hawaiian volcanoes, chiefly on Halemaumau]: Hawaiian Volcano Observatory, Monthly Bull., vol. 7, nos. 1-12, pls., 1919; vol. 8, nos. 1, 2, 6-12, pls., 1920.
896. Seismometric investigation of the Hawaiian lava column: Seismol. Soc. America, Bull., vol. 10, no. 4, pp. 155-275, 11 pls., December, 1920.

James, Albert V. G.

897. Factors producing columnar structure in lavas and its occurrence near Melbourne, Australia: Jour. Geology, vol. 28, no. 5, pp. 458-469, 16 figs., July-August, 1920.

Jandorf, Morton L.

898. Unusual minerals in limestone near York, Pennsylvania: *Am. Mineralogist*, vol. 5, no. 11, p. 196, November, 1920.

Jenkins, Olaf P.

899. Geologic map of Tennessee. Second edition. Tennessee State Geol. Survey, 1919. Scale, 1:500,000.
900. (and Wilson, Eldred D.). List of United States Geological Survey publications relating to Arizona: Arizona, Univ., Bull. no. 104 (geol. ser. no. 1), 40 pp., 1920.
901. (and Wilson, Eldred D.). A geological reconnaissance of the Tucson and Amole mountains: Arizona, Univ., Bull. no. 106 (geol. ser. no. 2), pp. 5-18, 7 figs., 3 pls., May, 1920.

Jennings, O. E.

902. Fossil plants from the beds of volcanic ash near Missoula, western Montana: Carnegie Mus., Mem., vol. 8, no. 2, pp. 385-450, 1 fig., 12 pls., September, 1920.

Jillson, Willard Rouse.

903. The oil and gas resources of Kentucky: Kentucky, Dept. Geology and Forestry, Series 5, Bull. 1, 630 pp., illus. (incl. maps), 1919. 2d ed., 1920.
904. The geology and coals of Stinking Creek, Knox County, Kentucky: Kentucky, Dept. Geology and Forestry, Series 5, Bull. 3, 89 pp., map, illus., 1919.
905. The migration of the headwaters divide of Right Middle Creek, Floyd County, Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 105-109, 1 fig., July 1, 1919. *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 60-64, 1 fig., January, 1919.
906. Sketch of the development of the oil and gas industry in Kentucky during the past century (1819-1919): Kentucky, Dept. Geology and Forestry, Mineral and Forest Resources of Kentucky, vol. 1, no. 1, pp. 3-28, 12 figs., April, 1919.
907. The used and unused natural gas fields of eastern Kentucky and their relation to present and future public service demands: Kentucky, Dept. Geology and Forestry, Mineral and Forest Resources of Kentucky, vol. 1, no. 1, pp. 29-36, 2 figs., April, 1919.
908. A bibliography of Kentucky petroleum, natural gas, asphalt, and oil shale: Kentucky, Dept. Geology and Forestry, Mineral and Forest Resources of Kentucky, vol. 1, no. 1, pp. 37-43, April, 1919.
909. Structural deformation and its relation to proven oil and gas accumulation in eastern Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 47-57, 7 figs., July 1, 1919.
910. The status of the Mauch Chunk in southeastern Kentucky as a producer of petroleum and natural gas: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 85-93, July 1, 1919.
911. The Kendrick shale; a new calcareous fossil horizon in the coal measures of eastern Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 96-104, 2 figs., July 1, 1919.

Jillson, Willard Rouse—Continued.

912. The low-sulphur coals of Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 115-119, 1 fig., July 1, 1919. Am. Inst. Min. and Met. Eng., Bull. no. 153, pp. 1675-1679, 1 fig., September, 1919; Trans., vol. 63, pp. 723-726, 1920.
913. The new oil and gas pools of Allen County: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 120-143, 3 figs., July 1, 1919.
914. The oil and gas geology of Breathitt and Knott counties: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 178-219, 6 figs., 2 maps, October 1, 1919; also in Ser. V, Bull. 4, pp. 98-139, 1920.
915. A bibliography of the coals of Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 285-301, October 1, 1919.
916. The production of coal in Kentucky: Kentucky Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 302-320, 10 figs., October 1, 1919.
917. The Wier sand—a newly recognized oil horizon in eastern Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 321-333, 2 figs., October 1, 1919.
918. The pay oil sands of eastern Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 334-366, 10 figs., October 1, 1919.
919. The new oil and gas pools of Warren County, Kentucky: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 368-396, 7 figs., map, October 1, 1919; also in Ser. V, Bull. 4, pp. 223-251, 1920.
920. Geologic map of Kentucky showing oil and gas pools and pipe lines and the eastern and western coal fields: Kentucky Geol. Survey, Series 6, 1920. Scale, 1 inch=10 miles.
921. New fossil invertebrates from a new fossil horizon in the coal measures of eastern Kentucky (abstract): Science, new ser., vol. 50, p. 95, July 25, 1919.
922. Contributions to Kentucky geology; an indexed collection of all the shorter papers and reports of the State geologist written during the year 1919 on the mineral resources of the commonwealth [chiefly petroleum, natural gas, and coal]: Kentucky, Dept. Geology and Forestry, Ser. 5, Bull. 4, 266 pp., 65 figs., 1920.
923. A bibliography of the several books, reports, papers, and maps relating to geology written and prepared by Willard Rouse Jillson: Kentucky Geol. Survey, Ser. no. VI (Pamphlet no. 1), 7 pp., Frankfort, Ky., 1920.
924. Geological problems in the recovery of oil and gas in Kentucky: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 303-312, 1 fig., 1920; Kentucky Geol. Survey, Ser. 6, vol. 2, pp. 59-70, 1921.
925. A Mauch Chunk island in the Mississippian seas of eastern Kentucky (abstract): Science, new ser., vol. 51, p. 492, May 14, 1920.

Johannsen, Albert.

926. (and Stephenson, E. A.). On the accuracy of the Rosiwal method for the determination of the minerals in a rock: *Jour. Geology*, vol. 27, no. 3, pp. 212-220, April-May, 1919.
927. A planimeter method for the determination of the percentage compositions of rocks: *Jour. Geology*, vol. 27, no. 4, pp. 276-285, 6 figs., May-June, 1919.
928. A quantitative mineralogical classification of igneous rocks—revised: *Jour. Geology*, vol. 28, nos. 1-3, pp. 38-60, 158-177, 210-232, 7 figs., 1920.

Johnson, Bertrand L.

929. Mining on Prince William Sound: *U. S. Geol. Survey, Bull.* 692, pp. 143-151, 1919.
930. Mineral resources of Jack Bay district and vicinity, Prince William Sound: *U. S. Geol. Survey, Bull.* 692, pp. 153-173, 1 pl., 1 fig. (maps), 1919.
931. Mining in central and northern Kenai Peninsula [Alaska]: *U. S. Geol. Survey, Bull.* 692, pp. 175-176, 1919.

Johnson, Douglas Wilson.

932. Shore processes and shore line development. 584 pp., 73 pls., 148 figs., New York, John Wiley & Sons, 1919.

Johnson, George F.

933. The Mayo silver area, Yukon Territory: *Canadian Min. Jour.*, vol. 41, pp. 990-991, December 3, 1920.

Johnson, H. H.

934. The Kirkland Lake gold field [northern Ontario]: *Min. Mag.*, vol. 21, no. 1, pp. 29-30, 2 figs., July, 1919.

Johnson, J. Harlan.

935. An interesting occurrence of isomorphous siderite and calcite: *Pahasapa Quart.*, vol. 9, no. 1, p. 20, December, 1919.
936. Water pool calcite, an interesting cave mineral: *Pahasapa Quart.*, pp. 61-64, 3 figs., February, 1920.
937. (and Snyder, J. P.) The caves of the Black Hills: *Pahasapa Quart.*, vol. 9, no. 4, pp. 175-187, 9 figs., June, 1920.

Johnson, Roswell H.

938. Variation in decline curves of various oil pools: *Mining and Metallurgy*, no. 157, sec. 1, p. 48 (abstract), sec. 8, 5 pp., January, 1920.
939. Water displacement in oil and gas sands: *Mining and Metallurgy*, no. 157, sec. 1, p. 50 (abstract), sec. 7, 4 pp., January, 1920. *Eng. and Min. Jour.*, vol. 109, pp. 516-517, February 21, 1900. Discussion by David White, G. H. Ashley, E. W. Shaw, and H. W. Hixon [Am. Inst. Min. and Met. Eng., Trans., preprint no. 994, pp. 5-9, 1920].
940. (and Huntley, Stirling). A résumé of the Pennsylvania New York oil field: *Mining and Metallurgy*, no. 158, sec. 1, p. 32 (abstract), sec. 23, 4 pp., February, 1920. Discussion by G. H. Ashley [Am. Inst. Min. and Metal. Eng., Trans., preprint no. 994, p. 3, 1920].
941. The cementation process in sandstone: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 1, pp. 33-35, 1920. *Eng. and Min. Jour.*, vol. 110, no. 3, pp. 125-126, July 17, 1920.

See also White, no. 2004.

Johnston, W. A.

942. Superficial deposits and soils of Winnipegosis area, Manitoba: Canada, Geol. Survey, Summ. Rept., 1918, pt. D, p. 11, 1920.

943. Late Pleistocene changes of level in northern Manitoba, Canada (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 131, March 31, 1920.

Jones, Edward L., jr.

944. A reconnaissance of the Pine Creek district, Idaho: U. S. Geol. Survey, Bull. 710, pp. 1-36, 1 pl. (map), August 27, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 637, December 4, 1919.

945. Deposits of manganese ore in New Mexico: U. S. Geol. Survey, Bull. 710, pp. 37-60, 1 fig. (map), October 21, 1919.

946. (and Ransome, F. L.). Deposits of manganese ore in Arizona: U. S. Geol. Survey, Bull. 710, pp. 93-184, 6 pls. (incl. maps), 8 figs., January 29, 1920.

947. Deposits of manganese ore in southeastern California: U. S. Geol. Survey, Bull. 710, pp. 185-208, 1 pl. (map), December 30, 1919. Abstract by R. W. Stone, Washington Acad. Sci. Jour., vol. 10, no. 16, pp. 470-471, October 4, 1920.

948. Some deposits of manganese ore in Colorado: U. S. Geol. Survey, Bull. 715, pp. 61-72, September 17, 1920.

949. Manganese deposits of the Colorado River desert region (abstract): Washington Acad. Sci., Jour., vol. 9, no. 13, pp. 384-385, July 19, 1919.

(with Pardee, J. T.). Deposits of manganese ore in Nevada: U. S. Geol. Survey, Bull. 710, pp. 209-248, 1 pl. (map), 2 figs., March 15, 1920. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 20, p. 573, December 4, 1920.

Jones, Grove B.

950. (and Brill, J. Bayard). Soil survey of Benton County, Indiana: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept., pp. 28-44, map, 1917.

Jones, Robert W.

951. The geology of the Catskill Portland-cement region [New York]: Am. Ceramic Soc., Jour., vol. 2, no. 11, pp. 870-882, 11 figs., 2 pls. (maps), November, 1919.

Jones, Walter B.

952. Statistics of the mineral production of Alabama for 1917: Alabama Geol. Survey, Bull. no. 21, 128 pp., 1920.

Jones, William F.

953. The relation of oil pools to ancient shore lines: Econ. Geology, vol. 15, no. 1, pp. 81-87, 1 fig., January-February, 1920.

Jordan, David Starr.

954. Fossil fishes of southern California; I, Fossil fishes of the Soledad deposits by David Starr Jordan; II, Fossil fishes of the Miocene (Monterey) formations by David Starr Jordan and James Zacheus Gilbert; III, Fossil fishes of the Pliocene formations, by David Starr Jordan and James Zacheus Gilbert: Leland Stanford Junior University Pub., Univ. ser., 98 pp., 31 pls., 1919.

Jordan, David Starr—Continued.

955. (and Gilbert, James Zaccheus). Fossil fishes of diatom beds of Lompoc, California: Leland Stanford Junior University Pub., Univ. ser., 44 pp., 29 pls., February, 1920.
 956. A Miocene catastrophe [fossil fish, Santa Barbara County, California]: Natural History, vol. 20, no. 1, pp. 18-22, 5 figs., January-February, 1920.

Katz, Frank J.

957. Garnet in North Carolina and the market for abrasive garnet: Eng. and Min. Jour., vol. 107, pp. 903-906, 1 fig., May 24, 1919.
 958. Silica in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 379-384, December 4, 1919.
 959. Abrasive materials in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 1171-1187, August 27, 1920.
 (with Stose, G. W., and others). Manganese deposits of the west foot of the Blue Ridge, Virginia: Virginia Geol. Survey, Bull. no. 17, 166 pp., 22 pls. (incl. maps), 16 figs., 1919.

Kay, George Frederick.

960. Twenty-fifth annual report of the State geologist; administrative report: Iowa Geol. Survey, vol. 27, pp. 1-11 [1920].
 961. Mineral production in Iowa for 1916: Iowa Geol. Survey, vol. 27, pp. 13-32 [1920].
 962. Some large boulders in the Kansan drift of southern Iowa: Iowa Geol. Survey, vol. 27, pp. 345-353, 5 figs. [1920].
 963. (and Pearce, J. Newton). The origin of gumbotil: Jour. Geology, vol. 28, no. 2, pp. 89-125, 1 fig. (map), February-March, 1920.
 964. Further discussion of the Aftonian gravels and their relation to the drift sheets in the region about Afton Junction and Thayer, Iowa (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 132-133, March 31, 1920.

Keele, Joseph.

965. Mesozoic clays in northern Ontario: Canada, Geol. Survey, Summ. Rept., 1919, pt. G, pp. 13-19, 1920.
 966. Clay and shale deposits of the Abitibi and Mattagami rivers: Ontario Bur. Mines, 29th Ann. Rept., vol. 29, pt. 2, pp. 31-55, 1 fig., 1920.

Keeney, Robert M.

967. Uranium and vanadium in 1918: Colorado School of Mines Mag., vol. 9, no. 10, pp. 273-278, October, 1919.

Kellogg, A. E.

968. Cinnabar ore in Jackson County, Oregon: Eng. and Min. Jour., vol. 107, p. 787, 2 figs., May 3, 1919.
 969. Placer mining in Oregon [Waldo district, Josephine County]: Eng. and Min. Jour., vol. 108, pp. 90-91, July 19, 1919.

Kemp, James F.

970. Memorial of John Duer Irving: Geol. Soc. America, Bull., vol. 30, pp. 37-42, port., March 31, 1919.
 971. Observations on a Florida sea beach with reference to oil geology: Econ. Geology, vol. 14, no. 4, pp. 302-323, 4 pls., June, 1919.
 972. Structural and petrographic geology: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 351-356, September 30, 1920.

Kemp, James F.—Continued.

- 973. *Geology in the law: Econ. Geology*, vol. 15, no. 3, pp. 259-265, April-May, 1920.
- 974. Memorial of Alexis Anastay Julien: *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 81-88, port., March 31, 1920.
- 975. Memorial of Gaillard Sherburne Rogers: *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 97-100, port., March 31, 1920.
- 976. (and Billingsley, Paul). Sweet Grass Hills, Montana (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 158-159, March 31, 1920.
See also Wheeler, no. 1950.

Kendall, J. D.

- 977. The formation of ore bodies: *Canadian Min. Inst., Trans.*, vol. 21, pp. 293-421, 64 figs. [1919].
- 978. The formation of coal: *Canadian Min. Inst., Monthly Bull.*, no. 86, pp. 600-606; no. 87, pp. 761-778; no. 88, pp. 877-882, 19 figs., June-August, 1919; *Trans.*, vol. 22, pp. 250-283, 19 figs. [1920].

Kew, William S. W.

- 979. Structure and oil resources of the Simi Valley, southern California: *U. S. Geol. Survey, Bull.* 691, pp. 323-347, 4 pls. (incl. map), 1 fig., April 9, 1919. Abstract by R. W. Stone, *Washington Acad. Sci., Jour.*, vol. 9, no. 15, pp. 441-442, September 19, 1919.
- 980. Geology of a part of the Santa Ynez River district, Santa Barbara County, California: *California, Univ., Dept. Geology, Bull.*, vol. 12, no. 1, pp. 1-21, 2 pls. (incl. map), 2 figs., November 20, 1919.
- 981. Cretaceous and Cenozoic Echinoidea of the Pacific coast of North America: *California, Univ., Dept. Geology, Bull.* vol. 12, no. 2, pp. 23-236, 40 pls., 5 figs., September 28, 1920.

Keyes, Charles.

- 982. Tectonic adjustment of a rotating straticulate spheroid: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 108-112, 5 figs., February, 1919.
- 983. Provincial unity of continental interior coal fields: *Iowa Acad. Sci., Proc.* 1918, vol. 25, pp. 545-550 [1919].
- 984. Preglacial Moingona River: *Iowa Acad. Sci., Proc.* 1918, vol. 25, pp. 551-559, 7 figs. [1919].
- 985. Alpine structures of Jasper Park [northwestern Alberta] (abstract): *Iowa Acad. Sci., Proc.* 1918, vol. 25, pp. 561-568, 2 pls. [1919].
- 986. Memorial of Garland Carr Broadhead: *Geol. Soc. America, Bull.*, vol. 30, pp. 13-27, port., March 31, 1919.
- 987. Geotectonic adaptation through retardation of the earth's rotation (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 87-88, March 31, 1919.
- 988. Tectonic form of the continents: *Science*, new ser., vol. 49, pp. 612-613, June 27, 1919.
- 989. Louisian vs. Mississippian as a periodic title (abstract): *Science*, new ser., vol. 50, p. 74, July 18, 1919.
- 990. Tertiary gravels of northern Utah (abstract): *Science*, new ser., vol. 50, p. 74, July 18, 1919.
- 991. Orogenics of the Great Basin: *Science*, new ser., vol. 50, p. 413, October 31, 1919.
- 992. Paleozoic diastrophics of the northern Mexican tableland: *Jour. Geology*, vol. 28, no. 1, pp. 75-83, 3 figs., January-February, 1920.

Keyes, Charles—Continued.

993. Geological setting of New Mexico: Jour. Geology, vol. 28, no. 3, pp. 233-254, 6 figs., April-May, 1920.
994. Telluric relations of dislocative fissure veins: Eng. and Min. Jour., vol. 109, pp. 965-966, April 24, 1920.
995. Isostatic measure of the Rocky Mountains: Geol. Mag., vol. 57, pp. 262-266, June, 1920.
996. Span of the great ice age: Annals of Iowa, 3d ser., vol. 12, no. 5, pp. 369-373, 1 pl., July 1920.
997. A century of Iowa geology: Iowa Acad. Sci., Proc., vol. 26, pp. 407-440, 13 pls. (port.) [1920].
998. Southward extension of the Bozeman Tertiaries into Utah (abstract): Iowa Acad. Sci., Proc., vol. 26, pp. 467-469 [1920].
999. Stratigraphic delimitation of St. Louis formation: Iowa Acad. Sci., Proc., vol. 26, pp. 471-475 [1920].
1000. Earth's radius of molar repose (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 111, March 31, 1920.
1001. Erosive clews to the high plateaus of Utah (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 151-152, March 31, 1920.

Kimball, James P.

1002. Relaciones geológicas y génesis de las minas de hierro especular de Santiago de Cuba: Cuba, Dirección Montes y Minas, Bol. Minas no. 5, pp. 83-95, 1919.

Kindle, E. M.

1003. Obituary, Lawrence M. Lambe, 1863-1919: Canadian Min. Inst., Monthly Bull., no. 85, pp. 544-545, May, 1919. Canadian Field-Naturalist, vol. 34, no. 3, pp. 56-57, March, 1920.
1004. A neglected factor in the rounding of sand grains: Am. Jour. Sci., 4th ser., vol. 47, pp. 431-434, June, 1919.
1005. Inequalities of sedimentation: Jour. Geology, vol. 27, no. 5, pp. 339-366, July-August, 1919.
1006. The discovery of a Portage fauna in the Mackenzie River valley: Canada, Geol. Survey, Mus. Bull., no. 29, pp. 1-8, 2 pls., October 18, 1919.
1007. The climatic interpretation of two early Ordovician mud-crack horizons: Canadian Field-Naturalist, vol. 33, no. 5, p. 96, November, 1919.
1008. Notes on the iron ores of Mackenzie River valley: Canada, Geol. Survey, Summ. Rept., 1919, pt. C, pp. 1-2, 1920.
1009. Memorial of Lawrence M. Lambe: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 88-97, port., March 31, 1920.
1010. Obituary, Walter R. Billings: Canadian Field-Naturalist, vol. 34, no. 3, pp. 57-58, March, 1920. Geol. Mag., vol. 57, pp. 287-288, June, 1920.

Kirk, Edwin.

1011. Paleozoic glaciation in southeastern Alaska (abstract): Washington Acad. Sci., Jour., vol. 9, no. 4, pp. 107-108, February 19, 1919.

Kirkpatrick, R. Z.

1012. Earthquakes in Panama up to January 1, 1920: Seismol. Soc. America, Bull., vol. 10, no. 3, pp. 121-128, September, 1920.

Klotz, Otto.

1013. The present status of the seismological work in the Pacific: *Seismol. Soc. America, Bull.*, vol. 10, no. 4, pp. 300-309, December, 1920.

Knapp, Arthur.

1014. Rock classification from the oil-driller's standpoint: *Eng. and Min. Jour.*, vol. 109, pp. 514-516, February 21, 1920. *Boletín de Petróleo*, vol. 9, no. 6, pp. 519-533, June, 1920.

Knight, Cyril W.

1015. (and Burrows, A. G., Hopkins, P. E., and Parsons, A. L.). Abitibi-Night Hawk gold area, District of Timiskaming: *Ontario Bur. Mines*, 28th Ann. Rept., vol. 28, pt. 2, pp. 1-70, 50 figs., map, 1919.
1016. Occurrence of elaterite, or elastic bitumen, in a fluorite vein at Madoc, Ontario: *Canadian Min. Jour.*, vol. 40, pp. 399-400, June 4, 1919.
1017. A new discovery of pitchblende [Butt township, Ontario]: *Canadian Min. Jour.*, vol. 40, p. 772, October 14, 1919.
1018. Windy Lake and other nickel areas [Ontario]: *Ontario Dept. Mines*, 29th Ann. Rept., vol. 29, pt. 1, pp. 193-224, 14 figs., map, 1920.
1019. Ben Nevis gold area: *Ontario Dept. Mines*, 29th Ann. Rept., vol. 29, pt. 3, pp. 1-27, 13 figs., map, 1920.
1020. Argonaut gold mine: *Ontario Dept. Mines*, 29th Ann. Rept., vol. 29, pt. 3, pp. 65-76, 5 figs., map, 1920.
- (with Burrows, A. G.). Lightning River gold area and a remarkable series of lava flows [Ontario]: *Canadian Min. Jour.*, vol. 40, pp. 83-86, February 12, 1919.
- (with Miller, Willet G.). Certain post-Timiskaming igneous rocks of Ontario for which the name Haileyburian is proposed: *Canadian Min. Jour.*, vol. 41, p. 653, August 13, 1920.
- (with Miller, Willet G.). Haileyburian intrusive rocks: *Ontario, Dept. Mines*, 29th Ann. Rept., vol. 29, pt. 1, pp. 235-236, 1920.

Knight, Nicholas.

- (with Reed, Burleigh B.). Some American dolomites: *Iowa Acad. Sci., Proc.*, vol. 26, pp. 377-378 [1920].

Kniker, Hedwig Thusnelda.

1021. Comanchean and Cretaceous Pectinidae of Texas: *Texas, Univ., Bull.* no. 1817, 56 pp., 10 pls., March 20, 1918.

Knopf, Adolph.

1022. A geologic reconnaissance of the Inyo Range and the eastern slope of the southern Sierra Nevada (U. S. Geol. Survey, Prof. Paper 110, 1918) (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 14, p. 414, August 19, 1919.

1023. Geology and ore deposits of the Yerington district, Nevada (U. S. Geol. Survey, Prof. Paper 114, 1918) (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 17, pp. 532-533, October 19, 1919.

1024. Tin in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 1, pp. 23-31, September 9, 1919.

1025. Present tendencies in geology; metalliferous deposits: *Econ. Geology*, vol. 14, no. 7, pp. 543-554, November, 1919. Abstract, *Washington Acad. Sci., Jour.*, vol. 9, no. 15, p. 543, September 19, 1919.

Knowlton, F. H.

1026. Relations between the Mesozoic floras of North and South America: *Geol. Soc. America, Bull.*, vol. 29, no. 4, pp. 607-614, December 30, 1918.

Knowlton, F. H.—Continued.

- 1027. A catalogue of the Mesozoic and Cenozoic plants of North America : U. S. Geol. Survey, Bull. 696, 815 pp., 1919.
- 1028. Evolution of geologic climates: Geol. Soc. America, Bull., vol. 30, no. 4, pp. 499–566, December 30, 1919; abstract, with title, Climates of the past, vol. 30, no. 1, p. 151, March 31, 1919.
- 1029. A dicotyledonous flora in the type section of the Morrison formation: Am. Jour. Sci., 4th ser., vol. 49, pp. 189–194, March, 1920.

Knox, John Knox.

- 1030. Geology of the serpentine belt, Coleraine sheet, Thetford-Black Lake mining district, Quebec. 67 pp., 3 pls., map, Thesis, University of Chicago, 1918.
- 1031. Geology of New Mexico as an index to probable oil resources: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 95–112, 1920.
- 1032. Probable oil resources of New Mexico: Eng. and Min. Jour., vol. 110, no. 2, pp. 69–74, July 10, 1920.

Koch, Lauge.

- 1033. Stratigraphy of northwest Greenland: Dansk geol. Foren., Meddel., Bd. 5, H. 5, no. 17, pp. 1–78, 12 figs., 1 pl., 1920.

Kraus, Edward Henry.

- 1034. The new mineralogical laboratory at the University of Michigan: Am. Mineralogist, vol. 4, no. 5, pp. 45–56, 4 figs., 2 pls., May, 1919.
- 1035. (and Hunt, Walter Fred). Mineralogy; an introduction to the study of minerals and crystals. xiv, 561 pp., 696 figs., New York, McGraw-Hill Book Company, 1920.

Kümmel, Henry B.

- 1036. Report of the State geologist: New Jersey, Dept. Conservation and Development, Ann. Rept., 1918, pp. 29–62, 2 pls., 1919.
- 1037. Report of the State geologist: New Jersey, Dept. Conservation and Development, Ann. Rept., 1919, pp. 31–53, 1919.
- 1038. Report of the State geologist: New Jersey, Dept. Conservation and Development, Ann. Rept., 1920, pp. 33–78, Trenton, N. J., 1920.

Kunz, George F.

- 1039. Reminiscences of William E. Hidden: Am. Mineralogist, vol. 4, nos. 8, 10, 11, pp. 100, 128–129, 142–145, August, October, and November, 1919.
- 1040. Alfred Joseph Moses; a biographical sketch: Mining and Metallurgy, no. 162, pp. 20–21, port., June, 1920.

LaForge, Laurence.

- 1041. [The Fall Line]: Min. Congress Jour., vol. 5, no. 8, p. 272, August, 1919.
- 1042. [The use of the words talus and shingle] (abstract): Washington Acad. Sci., Jour., vol. 9, no. 16, pp. 500–501, October 4, 1919.
(with Hull, J. P. D., and Crane, W. R.). Report on the manganese deposits of Georgia: Georgia Geol. Survey, Bull. no. 35, 295 pp., 11 pls., 26 figs., 2 maps, Atlanta, 1919.

Lahee, Frederic H.

- 1043. Graphic determination of dip components where dips are measured in feet per mile: Econ. Geology, vol. 14, no. 2, pp. 176–178, 1 fig., March–April, 1919; no. 3, pp. 262–263, May, 1919.

Lahee, Frederic H.

- 1044. Geologic factors in oil prospecting: Econ. Geology, vol. 14, no. 6, pp. 480-490, 5 figs., September-October, 1919.
- 1045. The barometric method of geologic surveying for petroleum mapping: Econ. Geology, vol. 15, no. 2, pp. 150-169, 8 figs., March, 1920.
- 1046. Relation of oil pools to ancient shore lines (discussion): Econ. Geology, vol. 15, no. 4, pp. 350-354, June, 1920.

Laird, George A.

- 1047. Wildcat drilling in Warren County, Kentucky: Eng. and Min. Jour., vol. 109, p. 1031, May 1, 1921.

Lambart, H. F. J.

- 1048. Notes on the Klutlan Glacier and glaciers of the Pacific coast ranges through Canada and Alaska: Canadian Alpine Jour., vol. 11, pp. 147-155, 3 pls., 1920.

Lambe, Lawrence M.

- 1049. The hadrosaur *Edmontosaurus* from the Upper Cretaceous of Alberta: Canada, Geol. Survey, Mem. 120, 79 pp., 39 figs., 1920.
- 1050. Description of a new genus and species (*Panoplosaurus mirus*) of an armored dinosaur from the Belly River beds of Alberta: Roy. Soc. Canada, Proc. and Trans., 3d ser., vol. 13, sec. 4, pp. 39-50, 12 pls., 1920.

Lambert, Walter D.

- 1051. The internal constitution of the earth: Washington Acad. Sci., Jour., vol. 10, no. 5, pp. 122-143, March 4, 1920.

Lane, Alfred C.

- 1052. Table for determining common rocks: Lefax, Philadelphia, January, 1919.
- 1053. Correlation of formations of Huronian group in Michigan (discussion of paper by R. C. Allen): Am. Inst. Min. and Met. Eng., Bull. no. 156, pp. 3113-3115, December, 1919.
- 1054. Till argillites (pellodites), pre-Cambrian, Permian, and Pleistocene (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 125, March 31, 1920.

Laney, F. B.

- (with Bastin, Edson S.). The genesis of the ores at Tonopah, Nevada (U. S. Geol. Survey, Prof. Paper 104, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 317-318, June 4, 1919.
- (with Livingston, D. C.). The copper deposits of the Seven Devils and adjacent districts (including Heath, Hornet Creek, Hoodoo, and Deer Creek): Idaho, Bur. Mines and Geology, Bull. no. 1, 105 pp., 13 pls., 11 maps, 1920.

Lang, S. S.

- 1055. Porphyry intrusions of the Michigan copper district: Eng. and Min. Jour., vol. 107, p. 452, March 8, 1919.
- 1056. Copper deposits of Lake Superior: Min. and Sci. Press, vol. 121, pp. 407-408, September, 18, 1920.

Larsen, Esper S.

1057. The occurrence of cinnabar near Black Pine, Idaho: Idaho, Univ., School of Mines, vol. 14, Bull. no. 2, pp. 65-67, January, 1919.
1058. (and Shannon, Earl V.). Boussingaultite from South Mountain, near Santa Paula, California: Am. Mineralogist, vol. 5, no. 7, pp. 127-129 July, 1920.
1059. (and Livingston, D. C.). Geology of the Yellow Pine cinnabar-mining district, Idaho: U. S. Geol. Survey, Bull. 715, pp. 73-83, 2 figs. (incl. map), September 15, 1920.
1060. (and Glenn, M. L.). Some minerals of the melanterite and chalcantite groups with optical data on the hydrous sulphates of manganese and cobalt: Am. Jour. Sci., 4th ser., vol. 50, pp. 225-233, September, 1920.
1061. (and Ross, Clarence S.). The R and S molybdenum mine, Taos County, New Mexico: Econ. Geology, vol. 15, no. 7, pp. 567-573, November, 1920.
(with Diller, J. S., and Fairchild, J. G.). High-grade tale for gas burners: Econ. Geology, vol. 15, no. 8, pp. 665-673, December, 1920.

Lawson, Andrew C.

1062. The mobility of the coast ranges of California; an exploitation of the elastic rebound theory: California, Univ., Pub., Dept. Geology, Bull., vol. 12, no. 7, pp. 431-473, 19 figs., January 11, 1921.

Ledoux, A.

1063. Sand and gravel in Ontario: Ontario Bur. Mines, Rept. 1918, vol. 27, pt. 2, 138 pp., 45 figs., map, 1918.

Ledoux, Albert R.

1064. Singing sands: Science, new ser., vol. 51, pp. 462-464, May 7, 1920.

Lee, Charles H.

- (with Ellis, Arthur J.). Geology and ground waters of the western part of San Diego County, California: U. S. Geol. Survey, Water-Supply Paper 446, 321 pp., 47 pls. (incl. maps), 18 figs., 1919.

Lee, Howard S.

1065. Pyrite deposits of Leadville, Colorado: Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 66-70, 1920.

Lee, O. Ivan.

1066. (and Wherry, Edgar T.). Manganotantalite from Amelia, Virginia: Am. Mineralogist, vol. 4, no. 7, pp. 80-83, 2 figs., July, 1919.

Lee, Willis T.

1067. Type section of the Morrison formation: Am. Jour. Sci., 4th ser., vol. 49, pp. 183-188, March, 1920. Abstract, with discussion by W. H. Twenhofel, Geol. Soc. America. Bull. vol. 31, no. 1, pp. 135-136, March 31, 1920.
1068. Notes on the Manzano group, New Mexico: Am. Jour. Sci., 4th ser., vol. 49, pp. 323-326, May, 1920.
See also Vaughan, no. 1873.

Lees, James H.

1069. A description of the region about Camp Dodge: Iowa Geol. Survey, 60 pp., 22 figs., map, 1918.
1070. The history of Boyer Valley: Iowa Acad. Sci., Proc., vol. 26, pp. 493-500, 2 figs. [1920].

Lees, James H.—Continued.

1071. Park sites along Des Moines valley: Iowa Acad. Sci., Proc. 1918, vol. 25, pp. 569-585, 2 pls., 13 figs. [1919].

1072. Some features of the Fort Dodge gypsum: Iowa Acad. Sci., Proc. 1918, vol. 25, pp. 587-597, 11 figs. [1919].

1073. (and Thomas, A. O.). The Ste. Genevieve marls near Fort Dodge and their fauna: Iowa Acad. Sci., Proc. 1918, vol. 25, pp. 599-616, 1 pl. [1919].

Leffingwell, Ernest de K.

1074. The Canning River region, northern Alaska: U. S. Geol. Survey, Prof. Paper 109, 251 pp., 35 pls. (incl. maps), 33 figs., 1919. Abstract by J. T. Pardee, Washington Acad. Sci., Jour., vol. 9, no. 13, pp. 375-376, July 19, 1919.

Leighton, Morris M.

1075. The road-building sands and gravels of Washington: Washington Geol. Survey, Bull. no. 22, 307 pp., 9 pls. (incl. maps), 36 figs. (outline county maps), 1919.

1076. Gravel deposits of Illinois: Illinois Soc. Engineers, 35th Ann. Rept., pp. 73-74, 1920.

1077. The present status of the Pleistocene in Illinois (abstract): Science, new ser., vol. 51, p. 521, May 21, 1920.

Leith, C. K.

1078. International control of minerals: Min. and Sci. Press, vol. 118, pp. 357-361, March 15, 1919.

1079. Internationalization of mineral resources (abstract): Geol. Soc. America, Bull., vol. 30, pp. 107-108, March 31, 1919.

1080. Memorial of Charles Richard Van Hise: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 100-110, port., March 31, 1920.

1081. Geologists as witnesses in mining litigation: Econ. Geology, vol. 15, no. 8, pp. 674-680, December, 1920.

Leonard, Arthur Gray.

1082. The geology of North Dakota: Jour. Geology, vol. 27, no. 1, pp. 1-27, 2 figs. (incl. map), January-February, 1919.

1083. The surface features of North Dakota and their origin: North Dakota Univ., Quart. Jour., vol. 9, no. 3, pp. 209-219, 2 pls., map, April, 1919.

1084. Possibilities of oil and gas in North Dakota: North Dakota Geol. Survey, Bull. no. 1, 9 pp., 1920.

Leonard, W. C.

1085. Facts concerning the Kentucky oil fields . . . 10 pp. [New York, 1919].

Leshner, C. E.

1086. [Maps of] coal fields and producing districts, Pennsylvania, Ohio, Indiana, Illinois, Kentucky, Tennessee, West Virginia, and part of Maryland, Virginia, Alabama and part of Georgia. Scale 1:1,000,000. U. S. Geological Survey, 1919.

1087. Coal in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 903-1049, 1203-1259, 15 figs., September 26 and November 18, 1919.

1088. Coal in 1918: U. S. Geological Survey, Mineral Resources, 1918, pt. 2, pp. 695-813, 1315-1392, 24 figs., 1 pl., May 28 and December 6, 1920.

Leverett, Frank.

- 1089. Features of the country around Camp Custer [near Battle Creek, Michigan] (abstract): Michigan Acad. Sci., 20th Ann. Rept., pp. 53-54, 1918.
- 1090. Drainage features and uplift of shore lines in Elsie and Perrinton quadrangles [Michigan] (abstract): Michigan Acad. Sci., 20th Ann. Rept., p. 55, 1918.
- 1091. Pleistocene epoch [in Minnesota]: U. S. Geol. Survey, Bull. 678, pp. 76-78, 1919.
- 1092. (and Sardeson, Frederick W.). Surface formations and agricultural conditions of the south half of Minnesota: Minnesota Geol. Survey, Bull. no. 14, 147 pp., 9 pls. (incl. map), 15 figs., 1919. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 16, pp. 471-472, October 4, 1920.
- 1093. Glacial and glacial lake features in the vicinity of Kalamazoo: Michigan Acad. Sci., 21st Ann. Rept., pp. 91-92, 1920.

Levison, Wallace Goold.

- 1094. Developing crystallized mineral specimens: Am. Mineralogist, vol. 4, no. 2, pp. 14-15, February, 1919.

Lewis, Alfred Strong.

- 1095. Ore deposits of Cave Creek district in Arizona: Eng. and Min. Jour., vol. 110, no. 15, pp. 713-716, 3 figs. (incl. map), October 9, 1920.

Lewis, J. Volney.

- 1096. Magnetic and non-magnetic chrome: Econ. Geology, vol. 14, no. 6, pp. 491-494, September-October, 1919.
- 1097. The magmatic origin of barite deposits: Econ. Geology, vol. 14, no. 7, pp. 568-570, November, 1919.
- 1098. Chrome-ore deposits in North Carolina: Eng. and Min. Jour., vol. 109, pp. 1112-1114, 3 figs., May 15, 1920.

Lewis, Robert S.

- 1099. (and Varley, Thomas). The mineral industry of Utah: Utah, Univ., Bull., vol. 10, no. 11 (Utah Engineering Station, Department of Metallurgical Research, Bull. no. 12), 201 pp., map (mining districts), December, 1919.

Lewis, S. J.

- 1100. The ore deposits of Mexico: Min. and Sci. Press, vol. 120, pp. 412-420, 2 figs. (maps), March 20, 1920; pp. 443-450, 7 figs., March 27, 1920; pp. 933-939, 6 figs., June 26, 1920; vol. 121, pp. 16-20, 5 figs., July 3, 1920; pp. 375-382, 5 figs., September 11, 1920; pp. 521-528, 5 figs., October 9, 1920.

Liddle, Ralph Alexander.

- 1101. The Marathon fold and its influence on petroleum accumulation: Texas, Univ., Bull. no. 1847, pp. 9-16, 1 pl., August 20, 1918 [1920].
- 1102. (and Prettyman, T. M.). Geology and mineral resources of Crockett County with notes on the stratigraphy, structure, and oil prospects of the central Pecos Valley: Texas, Univ., Bull. no. 1857, 97 pp., 4 pl. (incl. maps), 6 figs., October 10, 1918 [1920].

Lind, S. C.

1103. (and Davis, C. W.). A new deposit of uranium ore [Lusk, Wyoming]: Science, new ser., vol. 49, pp. 441-443, May 9, 1919.

Lindgren, Waldemar.

1104. Mineral deposits. 2d ed., 957 pp., 284 figs., New York. McGraw-Hill Book Company, 1919.
1105. (and Loughlin, G. F.). Geology and ore deposits of the Tintic mining district, Utah: U. S. Geol. Survey, Prof. Paper 107, 282 pp., 39 pls. (incl. maps), 49 figs., 1919. Abstract, Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 316-317, June 4, 1919.
1106. Economic geology as a profession (editorial): Econ. Geology, vol. 14, no. 1, pp. 79-86, January-February, 1919.
1107. Regarding magmatic nickel deposits: Econ. Geology, vol. 15, no. 6, pp. 535-538, September, 1920.
- See also Butler, no. 255; Wheeler, no. 1950.

Little, Homer P.

1108. A flowing artesian well at Winslow, Maine: Science, new ser., vol. 49 pp. 24-25, January 3, 1919.

Livingston, Douglas C.

1109. Geology of Idaho. In Northwest Mines Handbook, vol. 1, pp. 21-26, published by Sidney Norman, Spokane, Washington, 1918.
1110. Tungsten, cinnabar, manganese, molybdenum, and tin deposits of Idaho: Idaho, Univ., School of Mines, vol. 14, Bull. no. 2, 67 pp., 7 pls., January, 1919.
1111. (and Laney, F. B.). The copper deposits of the Seven Devils and adjacent districts (including Heath, Hornet Creek, Hoodoo, and Deer Creek): Idaho, Bur. Mines and Geology, Bull. no. 1, 105 pp., 13 pls., 11 maps, 1920.
- (with Varley, Thomas, and others). A preliminary report on the mining districts of Idaho: U. S. Bur. Mines, Bull. 166, pp. 1-89, 2 pls. (maps), 1919.
- (with Larsen, E. S.). Geology of the Yellow Pine cinnabar-mining district, Idaho: U. S. Geol. Survey, Bull. 715, pp. 73-83, 2 figs. (incl. map), September 15, 1920.
- (with Umpleby, J. B.). A reconnaissance in south central Idaho embracing the Thunder Mountain, Big Creek, Stanley Basin, Sheep Mountain, and Seafoam districts: Idaho, Bur. Mines and Geology, Bull. no. 3, 23 pp., map, 5 pls., 1920.

Lloyd, E. Russell.

1112. Petroleum in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 969-1169, 10 figs., September 20, 1920.

Lloyd, Stewart J.

1113. Relation of oil to carbon ratios (discussion): Econ. Geology, vol. 15, no. 1, pp. 94-96, January-February, 1920.

Lobeck, A. K.

1114. Block diagrams: Jour. Geography, vol. 19, no. 1, pp. 24-32, 15 figs., January, 1920.

Logan, C. A.

1115. Platinum and allied metals in California: California State Min. Bur., no. 85, 120 pp., 4 pls. (incl. maps), 10 figs., 1919.

Logan, William N.

1116. The occurrence of coal in Monroe County: Indiana Acad. Sci., Proc. 1918, pp. 172-176, 2 pls., 1919.
1117. Note on occurrence of indianaite in Monroe County, Indiana: Indiana Acad. Sci., Proc. 1918, pp. 177-182, 3 pls., 1919.
1118. A bio-chemical theory of the origin of indianaite: Science, new ser., vol. 49, p. 197, February 21, 1919.
1119. Kaolin of Indiana: Indiana, Dept. of Conservation, Division of Geology, Pub. no. 6, 131 pp., 43 pls. (incl. maps), 1919.
1120. Petroleum and natural gas in Indiana; a preliminary report: Indiana, Dept. Conservation, Pub. no. 8, 279 pp., 63 pls. and figs. (incl. maps), 1920.
1121. Report of the division of geology: Indiana, Dept. Conservation, 1st Ann. Rept. (reprinted from Year Book), pp. 9-39 [1920].

Loomis, F. B.

1122. An amphibian from the Eocene: Am. Jour. Sci., 4th ser., vol. 47, pp. 217-219, 1 fig., March, 1919.
1123. Pawnee Creek beds of Colorado (abstract): Geol. Soc. America, Bull., vol. 21, no. 1, p. 224, March 31, 1920.
1124. On *Ticholeptus rusticus* and the genera of Oreodontidae: Am. Jour. Sci., 4th ser., vol. 50, pp. 281-292, 4 figs., October, 1920.

Louderback, George D.

1125. Preliminary results of a study of the San Francisco Bay sediments (abstract with discussion by E. W. Shaw): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 123-125, March 31, 1920.
1126. Age of the scarp-producing faults of the Great Basin (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 127, March 31, 1920.
1127. Proceedings of the nineteenth annual meeting of the Cordilleran section, held at Pasadena, California, June 19-22, 1919; Geol. Soc. America, Bull., vol. 31, pp. 191-196, March 31, 1920.

Loughlin, G. F.

1128. Two lamprophyre dikes near Santaquin and Mount Nebo, Utah (U. S. Geol. Survey, Prof. Paper 120, pp. 101-109, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 8, p. 228, April 19, 1919.
1129. Oxidized zinc ores of Leadville, Colorado (U. S. Geol. Survey, Bull. 681, 1918) (abstract): Washington Acad. Sci., Jour., vol. 9, no. 17, p. 529, October 19, 1919.
1130. Rock products and the war (abstract): Geol. Soc. America, Bull., vol. 30, p. 97, March 31, 1919.
1131. Lime in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 583-613, May 13, 1919.
1132. (and Coons, A. T.). Stone in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 615-682, June 20, 1919.
1133. (and Coons, A. T.). Slate in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 267-282, 1 fig., October 23, 1919.

Loughlin, G. F.—Continued.

- 1134. (and Insley, Herbert). Lime in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 815-856, 3 figs., 3 pls., June 7, 1920.
- 1135. (and Coons, A. T.). Stone in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 1189-1313, 8 figs., 7 pls., October 11, 1920.
(with Lindgren, Waldemar). Geology and ore deposits of the Tintic mining district, Utah: U. S. Geol. Survey, Prof. Paper 107, 282 pp., 39 pls. (incl. maps), 49 figs., 1919. Abstract, Washington Acad. Sci., Jour., vol. 9, no. 11, pp. 316-317, June 4, 1919.
(with Butler, B. S., and others). The ore deposits of Utah: U. S. Geol. Survey, Prof. Paper 111, 672 pp., 74 figs., 57 pls. (incl. maps), 1920.

See also Smith, no. 1676.

Lovejoy, Ellis.

- 1136. Notes on fire clays of the northern Appalachian coal basin (with discussion): Am. Ceramic Soc., Jour., vol. 2, no. 5, pp. 374-390, May, 1919.

Lowe, E. N.

- 1137. Sixth biennial report, 1916-1917, of the director of the [Mississippi] State Geological Survey . . . 12 pp. [1918].
- 1138. Mississippi, its geology, geography, soil, and mineral resources (a revision, with additions, of Bulletin no. 12): Mississippi State Geol. Survey, Bull. no. 14, 346 pp., 20 figs., map, 1919.
- 1139. Oil and gas prospecting in Mississippi: Mississippi State Geol. Survey, Bull. no. 15, 80 pp., 1 pl., 1 fig., 1 map, 1919.
- 1140. Road-making materials of Mississippi: Mississippi State Geol. Survey, Bull. no. 16, 139 pp., 1 fig., March, 1920.

Lucas, Anthony F.

- 1141. Possible existence of deep-seated oil deposits on Gulf coast (with discussion by G. S. Rogers): Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 501-519, 5 figs., 1920.
- 1142. Urgency for deeper drilling on the Gulf coast: Mining and Metallurgy, no. 164, pp. 26-27, August, 1920 (abstract); Am. Inst. Min. and Met. Eng., Trans. [preprint no. 1004], 5 pp., 1 fig., 1920; discussion, no. 1038, pp. 44-48, January, 1921.

Lucke, P. K.

- 1143. The relation of sulphides to water level in Mexico: Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 143-146, 3 figs., 1920.

Lull, Richard Swann.

- 1144. Samuel Wendell Williston: Am. Jour. Sci., 4th ser., vol. 47, pp. 220-224, March, 1919.
- 1145. The sauropod dinosaur *Barosaurus* Marsh; redescription of the type specimens in the Peabody Museum, Yale University: Connecticut Acad. Arts and Sci., Mem., vol. 6, 42 pp., 7 pls., 10 figs., December, 1919.
- 1146. Tertiary artiodactyls from the Marsh collection (abstract): Geol. Soc. America, Bull., vol. 21, no. 1, p. 224, March 31, 1920.
- 1147. New Tertiary artiodactyls: Am. Jour. Sci., 4th ser., vol. 50, pp. 83-130, 25 figs., 1 pl., August, 1920.
- 1148. An upper Carboniferous footprint from Attleboro, Massachusetts: Am. Jour. Sci., 4th ser., vol. 50, pp. 234-236, 1 fig., September, 1920.

Lunt, Horace F.

1149. (and others). The oil shales of northwestern Colorado: Colorado, Bur. Mines, Bull. no. 8, 59 pp., 3 pls., 5 figs., 1919.

Luquer, Lea McI.

1150. Alfred J. Moses: Am. Mineralogist, vol. 5, no. 6, pp. 109-112, June, 1920.

Lyder, E. E.

- (with Allen, H. C.). A chemical survey of the natural gases of Kansas and Oklahoma: Kansas, Univ., Bull., vol. 19, no. 1, Engineering Bull. no. 11, Division of State Chemical Research, Bull. no. 3, 101 pp., 10 figs., 1919.

Lynch, F. C. C.

1151. Asbestos, a Canadian specialty: Min. and Sci. Press, vol. 120, pp. 531-533, 4 figs., April 10, 1920.

Mabery, Charles F.

1152. The genesis of petroleum as shown by its nitrogen constituents (abstract): Science, new ser., vol. 49, pp. 549-550, June 6, 1919.

Macaulay, R. M.

1153. The source of placer platinum in the Tulameen district of British Columbia: Eng. and Min. Jour., vol. 107, pp. 303-306, 1 fig., February 15, 1919.

McBeth, Reid Sayers.

1154. Pioneering the Gulf coast; a story of the life and accomplishments of Capt. Anthony F. Lucas. 80 pp., illus. [New York, 1918].
1155. Oil, the new monarch of motion . . . 210 pp., illus., New York, Markets Publishing Corp., 1919.

Mac Boyle, Errol.

1156. Mines and mineral resources of Nevada County: Chapters of State Mineralogist's Report, Biennial Period 1917-18, 270 pp., 4 pls., 32 figs., California State Min. Bur., 1919.
1157. Mines and mineral resources of Plumas County: Chapters of State Mineralogist's Report, Biennial Period 1917-18, 188 pp., 1 pl., 11 figs., California State Min. Bur., 1920.
1158. Mines and mineral resources of Sierra County: Chapters of State Mineralogist's Report, Biennial Period 1917-18, 144 pp., 3 pls., 18 figs., California State Min. Bur., 1920.

McCallie, S. W.

1159. Notes on the geology of Georgia: Jour. Geology, vol. 27, no. 3, pp. 165-179, 4 figs. (incl. map), April-May, 1919.

McCaskey, H. D.

1160. (and others). Our mineral supplies: U. S. Geol. Survey, Bull. 666, 278 pp., 6 figs., 1 pl., 1919.
1161. Quicksilver in 1916: U. S. Geol. Survey, Mineral Resources, 1916, pt. 1, pp. 757-773, February 19, 1919.
1162. (and Dunlop, J. P.). Gold and silver in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 605-651, 1 fig., 1 pl., May 9, 1919.
- (with Bastin, Edson S.). The work on mineral resources done by the United States Geological Survey: Min. and Sci. Press, vol. 121, pp. 166-168, July 31, 1920.

MacCaughey, Vaughan.

1163. Activity of Kilauea Volcano [Hawaii]: Science, new ser., vol. 49, pp. 188-189, February 21, 1919.

MacCaughey, William J.

1164. Note on the Becke reaction: Am. Mineralogist, vol. 5, no. 7, p. 134, July, 1920.

McCornack, Ellen Condon.

1165. Contributions to the Pleistocene history of Oregon: Oregon, Univ., Leaflet series, Geology Bull., vol. 6, no. 3, pt. 2, 23 pp., 2 figs., October, 1920.

McCoy, Alex. W.

1166. Notes on principles of oil accumulation: Jour. Geology, vol. 27, no. 4, pp. 252-262, 6 figs., May-June, 1919.

1167. Reply to discussion by C. W. Washburne on "Notes on principles of oil accumulation": Jour. Geology, vol. 28, no. 4, pp. 371-373, May-June, 1920.

1168. Experimental studies of subsurface relations in oil and gas fields (discussion): Econ. Geology, vol. 15, no. 8, pp. 680-682, December, 1920.

MacCurdy, H. M.

1169. Mastodon remains found in Gratiot County, Michigan: Michigan Acad. Sci., 21st Ann. Rept., pp. 109-110, 1920.

MacDonald, Donald Francis.

1170. Contributions to the geology and paleontology of the Canal Zone, Panama, and geologically related areas in Central America and the West Indies; the sedimentary formations of the Panama Canal Zone, with special reference to the stratigraphic relations of the fossiliferous beds: U. S. Nat. Mus., Bull. 103, pp. 525-545, 2 pls. (maps), 2 figs., 1919.

1171. (and others). Notes on the stratigraphy of Panama and Costa Rica: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 363-366, 1919.

1172. Some factors of Central American geology that may have a bearing on the origin of petroleum: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 263-268, 2 figs., 1920.

McEwan, Eula Davis.

1173. A study of the brachiopod genus *Platystrophia*: U. S. Nat. Mus., Proc., vol. 56, pp. 383-448, 11 pls., 1919. Review by F. A. Bather, Geol. Mag., vol. 57, pp. 88-90, February, 1920.

1174. The Ordovician of Madison, Indiana: Am. Jour. Sci., 4th ser., vol. 50, pp. 154-158, August, 1920.

McInnes, W.

1175. Report of the directing geologist: Canada, Geol. Survey, Summ. Rept., 1917, pt. A, pp. 1-14, 1919.

1176. Report of the directing geologist: Canada, Geol. Survey, Summ. Rept., 1918, pt. A, pp. 1-14, 1919.

Mac Kay, B. R.

1177. Placer operations in Cariboo area of British Columbia: Eng. and Min. Jour., vol. 107, pp. 1035-1041, 1 fig., June 14, 1919.

1178. Cariboo gold fields, British Columbia: Canada, Geol. Survey, Summ. Rept., 1918, pt. B, pp. 39-56, 3 figs., 1 pl., 1919.

Mac Kay, B. R.—Continued.

1179. Cariboo district, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 36-37, 1920.

(with Wilson, M. E.). Landslide adjacent to Riviere Blanche, St. Thuribe, Parish of St. Casimir, Portneuf County, Province of Quebec: Quebec (Province), Rept. on Mining Operations, 1918, pp. 152-156, 2 pls., 1919.

McKelvey, S. Robert.

1180. The Dinosauria. 20 pp., 7 figs., Denver, The Research Company, 1920.

Mackenzie, G. C.

1181. An investigation of certain Canadian platinum and manganese resources: Canadian Min. Inst., Trans., vol. 22, pp. 305-319, 3 figs. [1920].

McKinstry, Hugh E.

1182. The poorhouse quarry, Chester County, Pennsylvania. Am. Mineralogist, vol. 5, no. 6, pp. 121-122, June, 1920.

McLaughlin, D. H.

1183. Copper sulphides in syenite and pegmatite dikes: Econ. Geology, vol. 14, no. 5, pp. 403-410, August, 1919.

1184. Ore deposition and enrichment at the Evergreen mine, Gilpin County, Colorado: Econ. Geology, vol. 14, no. 6, pp. 465-479, 2 pls., September-October, 1919.

(with Bateman, Alan M.). Geology of the ore deposits of Kennecott, Alaska: Econ. Geology, vol. 15, no. 1, pp. 1-80, 6 pls., 12 figs., January-February, 1920.

McLaughlin, R. P.

1185. Conservation of oil and gas resources in California: Am. Assoc. Petroleum Geologists, Bull., vol. 4, pp. 17-26, 1920.

MacLean, A.

1186. Lignite in Saskatchewan: Canadian Inst. Min. and Metall., Monthly Bull. no. 101, pp. 685-699, 5 figs., September, 1920.

McLearn, F. H.

1187. Cretaceous, lower Smoky River, Alberta: Canada, Geol. Survey, Summ. Rept., 1918, pt. C, pp. 1-7, 1919.

1188. The Cretaceous of Peace and Athabaska valleys [Alberta]: Canada, Geol. Survey, Mem. 116, pp. 25-33, 1919.

1189. New species of pelecypods from the Cretaceous of northern Alberta: Canada, Geol. Survey, Mus. Bull. no. 29, pp. 9-12, 3 pls., October 18, 1919.

1190. Little Smoky River, Alberta: Canada, Geol. Survey, Summ. Rept., 1919, pt. C, pp. 13-14, 1920.

1191. Three new pelecypods from the Coloradoan of the Peace and Smoky valleys, Alberta: Canadian Field-Naturalist, vol. 34, no. 3, pp. 53-56, 1 pl., March, 1920.

(with Dowling, D. B., and Slipper, S. E.). Investigations in the gas and oil fields of Alberta, Saskatchewan, and Manitoba: Canada, Geol. Survey, Mem. 116, 89 pp., 14 pls. (incl. maps), 1919.

McLennan, J. C.

1192. Report on some sources of helium in the British Empire: Canada, Dept. Mines, Mines Branch, Bull. no. 31, 72 pp., 1 pl., 20 figs., 4 maps, 1920.

MacMillan, William D.

1193. The mathematics of isostasy. *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 318-323, May, 1920.

McNairn, William Harvey.

1194. The birth of a science [geology]: *Natural History*, vol. 20, no. 3, pp. 247-252, May-June, 1920.

Macready, George A.

1195. Petroleum industry of Trinidad: *Mining and Metallurgy*, no. 165, pp. 21-22, September, 1920 (abstract); *Am. Inst. Min. and Met. Eng., Trans.* [preprint no. 1017], 10 pp., 1 fig., 1920.

MacVicar, John.

1196. Coal areas northwest of Brule Lake, Alberta: *Canada, Geol. Survey, Summ. Rept.*, 1919, pt. C, pp. 8-13, 1 fig., 1920.

Maddren, A. G.

1197. Sulphur on Unalaska and Akun islands and near Stepovak Bay, Alaska: *U. S. Geol. Survey, Bull.* 692, pp. 283-298, 1 pl. (map), 6 figs., 1919. Abstract by R. W. Stone, *Washington Acad. Sci., Jour.*, vol. 9, no. 20, pp. 634-635, December 4, 1919.
1198. The beach placers of the west coast of Kodiak Island, Alaska: *U. S. Geol. Survey, Bull.* 692, pp. 299-319, 1 pl. (map), 1919. Abstract by R. W. Stone, *Washington Acad. Sci., Jour.*, vol. 19, no. 20, p. 635, December 4, 1919.

Mailhiot, Adhémar.

1199. Geology of a portion of the projected township of Lemieux, County of Gaspé, Province of Quebec: *Quebec (Province), Department of Colonization, Mines, and Fisheries, Rept. on Mining Operations*, 1918, pp. 134-145, map, 1919.
1200. Geology of Mount Albert, County of Gaspé, Province of Quebec: *Quebec (Province), Department of Colonization, Mines, and Fisheries, Rept. on Mining Operations*, 1918, pp. 146-151, 1919.
1201. The upper Harricana River gold area [Timiskaming County, Quebec]: *Canadian Min. Jour.*, vol. 40, pp. 765-770, 12 figs., October 14, 1919.
1202. Gold deposits at Lake Demontigny, Abitibi, P. Q.: *Quebec (Province), Dept. Colonization . . . , Rept. on Mining Operations*, 1919, pp. 125-158, 3 pls., 5 figs., map, 1920.
1203. The new zinc and lead fields of Gaspé Peninsula [Quebec]: *Canadian Min. Inst., Trans.*, vol. 22, pp. 368-377, 1 fig. [1920].
1204. Molybdenite deposits of Lacorne Township, Abitibi, P. Q.: *Canadian Min. Jour.*, vol. 41, pp. 135-138, 4 figs., February 18, 1920.

Malcolm, Wyatt.

- (with Camsell, Charles). The Mackenzie River basin: *Canada, Geol. Survey, Mem.* 108, 154 pp., 14 pls., 1 fig., map, 1919.

Malott, Clyde A.

1205. The "American Bottoms" region of eastern Greene County, Indiana—a type unit in southern Indiana physiography: *Indiana Univ. Studies*, vol. 6, Study no. 40, 61 pp., 10 figs., 2 maps, March, 1919.
1206. (and Thompson, J. D., jr.). The stratigraphy of the Chester series of southern Indiana (abstract): *Science, new ser.*, vol. 51, pp. 521-522, May 21, 1920.
1207. A notable case of successive stream piracy in southern Indiana (abstract): *Science, new ser.*, vol. 51, p. 523, May 21, 1920.

Manchester, James G.

1208. The minerals of the Bergen archways [New Jersey]: *Am. Mineralogist*, vol. 4, no. 9, pp. 107-116, 4 pls., 5 figs., September, 1919.

Mansfield, George Rogers.

1209. Preliminary report on potash exploration in New Jersey greensands: New Jersey, Dept. Conservation and Development, *Ann. Rept.* for 1919, pp. 99-104, 1919.
1210. General features of the New Jersey glauconite beds: *Econ. Geology*, vol. 14, no. 7, pp. 555-567, November, 1919.
1211. Geography, geology, and mineral resources of the Fort Hall Indian Reservation, Idaho: U. S. Geol. Survey, *Bull.* 713, 152 pp., 4 figs., 12 pls. (incl. maps), 1920.
1212. Types of Rocky Mountain structure in southeastern Idaho (abstract with discussion by G. W. Stose): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 126-127, March 31, 1920.
1213. The Wasatch and Salt Lake formations of southeastern Idaho: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 399-406, 1 fig., June, 1920.
1214. Triassic and Jurassic in southeastern Idaho and neighboring regions: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 53-64, 3 figs., July, 1920.
1215. The physical and chemical character of New Jersey greensand: *Econ. Geology*, vol. 15, no. 7, pp. 547-566, 1 pl., November, 1920.
1216. Coal in eastern Idaho: U. S. Geol. Survey, *Bull.* 716, pp. 123-153, 2 pls. (maps), 3 figs., December 14, 1920.

Martin, G. C.

1217. The Nenana coal field, Alaska: U. S. Geol. Survey, *Bull.* 664, 54 pp., 11 pls. (maps), 1919. Abstract by R. W. Stone, *Washington Acad. Sci., Jour.*, vol. 9, no. 11, pp. 320-321, June 4, 1919.
1218. The Alaskan mining industry in 1917: U. S. Geol. Survey, *Bull.* 692, pp. 11-42, 1919.
1219. Geologic problems at the Matanuska coal mines [Alaska]: U. S. Geol. Survey, *Bull.* 692, pp. 269-282, 3 figs., 1919. Abstract, *Washington Acad. Sci., Jour.*, vol. 9, no. 20, p. 634, December 4, 1919.
1220. Gold, silver, copper, and lead in Alaska in 1918: U. S. Geol. Survey, *Mineral Resources*, 1918, pt. 1, pp. 127-142, October 30, 1919.
1221. (and others). Mineral resources of Alaska; report on progress of investigations in 1918: U. S. Geol. Survey, *Bull.* 712, 204, xv pp., 6 pls. (incl. maps), 10 figs., 1920.
1222. Mineral resources of Alaska; preface; administrative report: U. S. Geol. Survey, *Bull.* 712, pp. 1-10, 1919.
1223. The Alaskan mining industry in 1918: U. S. Geol. Survey, *Bull.* 712, pp. 11-52, 1919.

See also Capps, nos. 292, 293; Chapin, nos. 332, 333; Harrington, nos. 761, 762, 763, 764; Mertie, nos. 1241, 1242.

Mason, Shirley L.

1224. A statistical investigation of the effects of structure upon oil and gas production in the Osage [Nation, Oklahoma]: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 407-417, 6 figs., 1919.

Mather, Kirtley F.

1225. The manipulation of the telescopic alidade in geologic mapping: *Denison Univ., Sci. Lab., Bull.*, vol. 19, pp. 97-142, 13 figs., September, 1919.

Mather, Kirtley F.—Continued.

1226. (and Mehl, Maurice G.). The importance of drainage area in estimating the possibilities of petroleum production from an anticlinal structure: Denison Univ., Sci. Lab., Bull., vol. 19, pp. 143-146, 1 pl., September, 1919.
1227. Oil and gas resources of the northeastern part of Sumner County, Tennessee: Tennessee, State Geol. Survey, Bull. 24 (Pt. 2-B, Ann. Rept., 1919), 39 pp., 1 pl. (map), 1 fig., 1920.
- (with Heald, K. C.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 26 N., R. 8 E., U. S. Geol. Survey, Bull. 686, pp. 223-236, 1 pl. (map), 2 figs., 1919.
- (with Shaw, Eugene Wesley). The oil fields of Allen County, Kentucky, with notes on the oil geology of adjoining counties: U. S. Geol. Survey, Bull. 688, 126 pp., 10 pls. (incl. maps), 10 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 15, p. 439, September 19, 1919.

Mathews, Edward B.

1228. Relative efficiency of normative and modal classifications of igneous rocks (abstract): Geol. Soc. American, Bull., vol. 30, pp. 91-92, March 31, 1919.
1229. Relation of student and teacher: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 393-394, September 30, 1920.

Matsuyama, Motonori.

1230. On some physical properties of ice (with introductory note by T. C. Chamberlin): Jour. Geology, vol. 28, no. 7, pp. 607-631, 13 figs., October-November, 1920.

Matteson, W. G.

1231. A review of the development in the new central Texas oil fields during 1918: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 163-211, 5 figs., 1919. Econ. Geology, vol. 14, no. 2, pp. 95-146, 1 pl., 3 figs., March-April, 1919.
- See also Brokaw, no. 201.

Matthes, François Emile.

1232. Relief shading of topographic maps (abstract): Washington Acad. Sci., Jour., vol. 9, no. 10, p. 293, May 19, 1919.
1233. Cockscomb Crest [Sierra Nevada]: Sierra Club Bull., vol. 11, no. 1, pp. 21-28, 5 pls., January, 1920.

Matthew, G. F.

1234. The delta of the Little River group and some of its peculiarities: Roy. Soc. Canada, Proc. and Trans., 3d ser., vol. 13, sec. 4, pp. 17-21, 1920.
- (with Bailey, L. W.). Some problems of New Brunswick geology: Roy. Soc. Canada, Trans., 3d ser., vol. 12, sec. 4, pp. 105-130, 1919.

Matthew, William Diller.

1235. Affinities and origin of the Antillean mammals: Geol. Soc. America, Bull., vol. 29, no. 4, pp. 657-666, December 30, 1918.
1236. Contributions to the Snake Creek fauna; with notes upon the Pleistocene of western Nebraska: Am. Mus. Nat. Hist., Bull., vol. 38, pp. 183-229, 7 pls., 20 figs., 1918.

Matthew, William Diller—Continued.

1237. (and Granger, Walter). A revision of the lower Eocene Wasatch and Wind River faunas; Part V, Insectivora (continued), Glires. Edentata: Am. Mus. Nat. Hist., Bull., vol. 38, pp. 565-657, 68 figs., 1918.
1238. [Evolution of the dinosaurs.]: Natural History, vol. 19, nos. 4-5, pp. 491-493, April-May, 1919.
1239. Recent discoveries of fossil vertebrates in the West Indies and their bearing on the origin of the Antillean fauna: Am. Philos. Soc., Proc., vol. 58, no. 3, pp. 161-181, 1919. Abstract, Science, new ser., vol. 49, pp. 546-547, June 6, 1919.
1240. Plato's Atlantis in paleogeography: Nat. Acad. Sci., Proc., vol. 6, no. 1, pp. 17-18, January 15, 1920.
1241. Flying reptiles: Natural History, vol. 20, no. 1, pp. 73-81, 4 figs., January-February, 1920.
1242. Status and limits of the Paleocene (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 221, March 31, 1920.
1243. New specimen of the Pleistocene bear *Arctotherium* from Texas (abstract): Geol. Soc. America, Bull., vol. 21, no. 1, pp. 224-225, March 31, 1920.
1244. John Campbell Merriam; new president of the Carnegie Institution: Natural History, vol. 20, no. 3, pp. 253-254, port., May-June, 1920.
1245. Social evolution; a paleontologist's viewpoint: Natural History, vol. 20, no. 4, pp. 374-377, September-October, 1920.
1246. Canadian dinosaurs: Natural History, vol. 20, no. 5, pp. 539-544, 4 figs., November-December, 1920.
1247. The proofs of the evolution of man: Natural History, vol. 20, no. 5, pp. 574-575, November-December, 1920.
(with Clarke, John M.). Supposed fossil horse from the late Pleistocene found at Monroe, Orange County, New York (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 204, March 31, 1920.

Maury, Carlotta Joaquina.

1248. On the correlation of Porto Rican Tertiary formations with other Antillean and mainland horizons: Am. Jour. Sci., 4th ser., vol. 48, pp. 209-215, September, 1919.
1249. A proposal of two new Miocene formational names: Science, new ser., vol. 50, p. 591, December 26, 1919.
1250. Tertiary Mollusca from Porto Rico and their zonal relations: Scientific Survey of Porto Rico and the Virgin Islands, vol. 3, pt. 1, pp. 1-77, 9 pls., New York Acad. Sci., 1920.

Maynard, T. Poole.

1251. Cartersville potash slates; their economic relation to chemical and industrial post-war development (abstract): Geol. Soc. America, Bull., vol. 30, p. 112, March 31, 1919.

Mead, Warren J.

1252. Notes on the mechanics of geologic structures: Jour. Geology, vol. 28, no. 6, pp. 505-523, 12 figs., September-October, 1920.

Megraw, H. A.

1253. Gold mining in the Southern States: Eng. and Min. Jour., vol. 110, no. 20, pp. 938-940, 1 fig., November, 1920.

Mehl, Maurice G.

1254. The use of outline charts in teaching vertebrate paleontology: Denison Univ., Sci. Lab., Bull., vol. 19, pp. 47-53, 4 pls., 1 fig., April, 1919.
1255. Some factors in the geographic distribution of petroleum: Denison Univ., Sci. Lab., Bull., vol. 19, pp. 55-63, 2 pls. (maps), April, 1919.
1256. The use of models in the interpretation of data for determining the structure of bedded rocks: Denison Univ. Bull., Scientific Laboratories, Jour., vol. 19, pp. 157-167, 1 pl., 6 figs., May, 1920.
1257. Some suggestions for indicating drilling operations: Denison Univ. Bull., Scientific Laboratories, Jour., vol. 19, pp. 169-174, 3 figs., May, 1920.
1258. The influence of the differential compression of sediments on the attitude of bedded rocks (abstract): Science, new ser., vol. 51, p. 520, May 21, 1920.
1259. "Petroliferous provinces": Science, new ser., vol. 51, pp. 541-543, May 28, 1920.
(with Mather, Kirtley F.). The importance of drainage area in estimating the possibilities of petroleum production from an anticlinal structure: Denison Univ., Sci. Lab., Bull., vol. 19, pp. 143-146, 1 pl., September, 1919.

Meinzer, Oscar E.

1260. Quantitative methods of estimating ground-water supplies: Geol. Soc. America, Bull., vol. 31, no. 2, pp. 329-338, June 30, 1920. Abstract, Geol. Soc. America, Bull., vol. 31, no. 1, p. 156, March 31, 1920; Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 293-294, May 19, 1919.

See also Berkey, no. 125.

Melcher, A. F.

1261. Determination of pore space of oil and gas sands: Mining and Metallurgy, no. 160, pp. 31-32 (abstract), sec. 5, 22 pp., 3 figs., April, 1920; discussion by R. V. A. Mills and C. W. Washburne. [Am. Inst. Min. and Metal Eng., Trans. preprint] no. 1038, pp. 51-59, January, 1921.
1262. Memorial of Grove Karl Gilbert: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 26-64, port., March 31, 1920.

Merriam, C. Hart.

1263. Grove Karl Gilbert, the man: Sierra Club Bull., vol. 10, no. 4, pp. 391-396, port., January, 1919.
1264. Tertiary mammalian faunas of the Mohave Desert: California, Univ., Dept. Geology, Bull., vol. 11, no. 5, pp. 437 a-e, 438-585, 253 figs., August 30, 1919.
1265. The beginnings of human history read from the geological record; the emergence of man: Sci. Monthly, vol. 9, no. 3, pp. 193-209, 8 figs., September, 1919; vol. 10, no. 4, pp. 321-342, 18 figs., April, 1920; no. 5, pp. 425-437, 11 figs., May, 1920.
1266. Earth sciences as the background of history: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 233-246, March 31, 1920.
1267. The teaching of historical geology as a factor conditioning research: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 339-349, September, 30, 1920.

Merrill, George Perkins.

1268. The composition and structure of meteorites compared with that of terrestrial rocks: Smithsonian Inst., Ann. Rept., 1917, pp. 175-188, 9 pls., 4 figs., 1919.
1269. The percentage number of meteorite falls and finds considered with reference to their varying basicity: Nat. Acad. Sci., Proc., vol. 5, no. 2, pp. 37-39, February, 15, 1919.
1270. A heretofore undescribed meteoric stone from Kansas City, Missouri: U. S. Nat. Mus., Proc., vol. 55, pp. 95-96, 2 pls., 1919.
1271. Second report on researches on the chemical and mineralogical composition of meteorites: Nat. Acad. Sci., Mem., vol. 14, 4th mem., 15 pp., 5 pls., 4 figs., 1919.
1272. The Cumberland Falls meteorite: Science, new ser., vol. 50, p. 90, July 25, 1919.
1273. Contributions to a history of American State geological and natural history surveys: U. S. Nat. Mus., Bull. 109, 549 pp., 37 pls. (portraits), 1920.
1274. Report on the department of geology: U. S. Nat. Mus., Ann. Rept. 1920, pp. 101-115, 1 pl., 1920.
1275. The Cumberland Falls, Whitley County, Kentucky, meteorite: U. S. Nat. Mus., Proc., vol. 57, pp. 97-105, 5 pls., 1 fig., 1920. Abstract, Geol. Soc. America, Bull., vol. 31, no. 1, p. 160, March 31, 1920.
1276. Notes on the meteorite of Estherville, Iowa, with special reference to its included "peckhamite" and probable metamorphic nature: U. S. Nat. Mus., Proc., vol. 58, pp. 363-370, 3 pls., 1920.
1277. On chondrules and chondritic structure in meteorites: Nat. Acad. Sci., Proc., vol. 6, no. 8, pp. 449-472, 17 figs., 1 pl., August 15, 1920.
1278. Obituary, Joseph Paxson Iddings: Am. Jour. Sci., 4th ser., vol. 50, p. 316, October, 1920.

Merriitt, J. W.

1279. Pennsylvanian sedimentation around Healdton Island [Healdton, Oklahoma]: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 47-52, 4 figs., 1920.
1280. Structures of western Chaves County, New Mexico: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 53-57, 5 figs., 1920.

Mertie, J. B.

1281. Repeated stream piracy in the Tolovana and Hess River basins, Alaska (abstract): Washington Acad. Sci., Jour., vol. 9, no. 4, pp. 109-110, February 19, 1919.
1282. Platinum-bearing gold placers of the Kahiltna Valley [Alaska]: U. S. Geol. Survey, Bull. 692, pp. 233-264, 1 pl. (map), 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 633, December 4, 1919.
1283. Chromite deposits in Alaska: U. S. Geol. Survey, Bull. 692, pp. 265-267, 1 fig., 1919. Abstract by G. C. Martin, Washington Acad. Sci., Jour., vol. 9, no. 20, pp. 633-634, December 4, 1919.
1284. The Salt Chuck palladium-copper mine [Prince of Wales Island, Alaska]: Eng. and Min. Jour., vol. 110, no. 1, pp. 17-20, 6 figs., July 3, 1920.

Merwin, Herbert E.

1285. (and Posnjak, E.). The iron hydroxide minerals (abstract): Washington Acad. Sci., Jour., vol. 9, no. 4, pp. 108-109, February 19, 1919.

Merwin, Herbert E.—Continued.

1286. (and Hostetter, J. C.). Hematite and rutile formed by the action of chlorine at high temperatures: *Am. Mineralogist*, vol. 4, no. 10, pp. 126-127, 1 fig., October, 1919.
1287. Some features of stream development and of glaciation in the Catskill Mountains (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 152, March 31, 1920.
1288. Chemical researches on sediments: *Geol. Soc. America, Bull.*, vol. 31, no. 4, pp. 419-423, November 30, 1920.
- (with Posnjak, Eugen). The hydrated ferric oxides: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 311-348, 5 figs., May, 1919.
- (with Ferguson, J. B.). The ternary system CaO-MgO-SiO_2 : *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 81-123, 17 figs., August, 1919.
- (with Ferguson, J. B.). Wollastonite (CaO.SiO_2) and related solid solutions in the ternary system lime-magnesia-silica: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 165-189, 8 figs., September, 1919.
- See also Davy, no. 475.

Meserve, Philip W.

1289. Note on the depth of the Champlain submergence along the Maine coast: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 207-208, 1 fig., September, 1919.

Meyer, H. C.

1290. Zirconia, its occurrence and application: *Mineral Foote-Notes*, vol. 3, no. 2, pp. 2-12, March-April, 1919.

Michelson, A. A.

1291. (and Gale, Henry G.). The rigidity of the earth: *Jour. Geology*, vol. 27, no. 8, pp. 585-601, 8 figs., 1 pl., November-December, 1919.

Middleton, Jefferson.

1292. Fuller's earth in 1918: *U. S. Geological Survey, Mineral Resources*, 1918, pt. 2, pp. 135-140, August 27, 1919.

Miller, Arthur McQuiston.

1293. The geology of Kentucky . . . [with introduction by August F. Foerste]: Kentucky, Dept. Geology and Forestry, Series 5, Bull. 2, xxix, 392 pp., 114 illus. (incl. maps), Frankfort, 1919.
1294. The Cumberland Falls meteorite: *Science*, new ser., vol. 49, pp. 541-542, June 6, 1919.
1295. The McCreary County [Kentucky] aerolite (abstract): *Science*, new ser., vol. 50, p. 96, July 25, 1919.
1296. The Cumberland Falls meteorite: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 110-114, 2 figs., July 1, 1919.
1297. Geology of Allen County: Kentucky, Dept. Geology and Forestry, Ser. V. [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 220-242, 8 figs., map, October 1, 1919.
1298. Cumberland Falls, Kentucky, meteorite (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 159-160, March 31, 1920.
1299. Professor Field's use of the term fossil: *Science*, new ser., vol. 52, p. 408, October 29, 1920.

Miller, Benjamin Leroy.

- (with Bascom, Florence). Description of the Elkton and Wilmington quadrangles, Maryland-Delaware-New Jersey-Pennsylvania: *U. S. Geol. Survey, Geol. Atlas, Elkton-Wilmington folio* (no. 211), 22 pp., 4 maps, 1920.

Miller, E. R.

- (with Winchell, A. N.). Further notes on the dust fall of March 9, 1918: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 133-134, February, 1919.

Miller, Willet G.

1300. The pre-Cambrian of central Canada (abstract): *Geol. Mag.*, new ser., dec. 6, vol. 6, pp. 524-526, November, 1919.
1301. (and Knight, Cyril W.). Certain post-Timiskaming igneous rocks of Ontario for which the name Haileyburian is proposed: *Canadian Min. Jour.*, vol. 41, p. 653, August 13, 1920.
1302. (and Knight, Cyril W.). Haileyburian intrusive rocks: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 1, pp. 235-236, 1920.

Miller, William J.

1303. Geology of the Lake Placid quadrangle: New York State Mus., Bull. nos. 211, 212, 106 pp., 30 pls., 8 figs., map, 1919.
1304. Geology of the Schroon Lake quadrangle: New York State Mus., Bull. no. 213, 214, 102 pp., 14 pls., 9 figs., map, 1919.
1305. Pegmatite, silicite, and aplite of northern New York: *Jour. Geology*, vol. 27, no. 1, pp. 28-54, 11 figs., January-February, 1919. Abstract, *Geol. Soc. America, Bull.*, vol. 30, p. 93, March 31, 1919.
1306. Silicite, a new rock name: *Science*, new ser., vol. 49, p. 149, February, 7, 1919.
1307. Magnetic iron ore deposits of Clinton County, New York (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 93-94, March 31, 1919.
1308. Significance of the gorge at Little Falls, New York: *Jour. Geography*, vol. 18, no. 4, pp. 156-158, April, 1919.
1309. Magnetic iron ores of Clinton County, New York: *Econ. Geology*, vol. 14, no. 7, pp. 509-535, 2 pls., 1 fig., November, 1919.
1310. How the Adirondacks were made: *The Conservationist*, Albany, N. Y., vol. 3, no. 3, pp. 35-38, 4 figs., March, 1920.
1311. Anorthosite gabbro in northern New York (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 140-141, March 31, 1920.

Millikan, C. V.

1312. Interrelations of the folds of Osage County, Oklahoma: *Am. Assoc. Petroleum Geologists, Bull.* vol. 4, no. 2, pp. 151-158, 6 figs., 1920.

Mills, R. Van A.

1313. (and Wells, Roger C.). The evaporation and concentration of waters associated with petroleum and natural gas: *U. S. Geol. Survey, Bull.* 693, 104 pp., 4 pls., 5 figs., 1919. Abstract, *Washington Acad. Sci., Jour.*, vol. 9, no. 17, pp. 529-530, October 19, 1919.
1314. Experimental studies of subsurface relationships in oil and gas fields: *Econ. Geology*, vol. 15, no. 5, pp. 398-421, 4 pls., 1 fig., July-August, 1920.
- (with Robinson, Heath M.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 27 N., R. 11 E.: *U. S. Geol. Survey, Bull.* 686, pp. 255-277, 2 pls. (incl. map), 3 figs., 1919.
- (with Robinson, Heath M.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 27 N., R. 10 E.: *U. S. Geological Survey, Bull.* 686, pp. 303-327, 3 pls. (incl. map), 2 figs., 1919.

See also Ambrose, no. 29; Melcher, no. 1261; Washburne, no. 1955.

Miser, Hugh D.

1315. (and Purdue, A. H.). Asphalt deposits and oil conditions in south western Arkansas (U. S. Geol. Survey, Bull. 691, pp. 271-292 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 4, p. 104, February 19, 1919.
1316. Manganese deposits of the Batesville district, Arkansas (abstract): Washington Acad. Sci., Jour., vol. 9, no. 13, p. 384, July 19, 1919.
1317. (and Fairchild, J. G.). Hausmannite in the Batesville district, Arkansas: Washington Acad. Sci., Jour., vol. 10, no. 1, pp. 1-8, January 4, 1920.
1318. Mississippian tuff in the Ouachita Mountain region (abstract with discussion by Sidney Powers): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 125-126, March 31, 1920.
1319. Geology and general topographic features of Arkansas. In Ferguson, Jim G., Outlines of Arkansas geology, pp. 21-42, Little Rock, 1920.
1320. Preliminary report on the deposits of manganese ore in the Batesville district, Arkansas: U. S. Geol. Survey, Bull. 715, pp. 93-124, 3 pls. (incl. map), 4 figs., November 15, 1920.
- (with Stose, G. W., and others). Manganese deposits of the west foot of the Blue Ridge, Virginia: Virginia Geol. Survey, Bull. no. 17, 166 pp., 22 pls. (incl. maps), 16 figs., 1919.
- See also Honess, no. 861.

Mishler, R. T.

1321. Geology of the El Tigre district, Mexico: Min. and Sci. Press, vol. 121, pp. 583-591, p. figs., October 23, 1920.

Mitchell, Graham John.

1322. Ore deposition in the Warren district, Arizona: Eng. and Min. Jour., vol. 109, pp. 874-875, 1 fig., April 10, 1920.
1323. Vertical extent of copper ore minerals in the Junction mine, Warren district, Arizona: Eng. and Min. Jour., vol. 109, pp. 1411-1412, 2 figs., June 26, 1920.
1324. Effect of erosion on mineralized areas in northern Sonora: Eng. and Min. Jour., vol. 110, no. 23, pp. 1081-1082, December 4, 1920.

Mitchell, W. G.

1325. Certain ore deposits of the Southwest (discussion): Am. Inst. Min. and Met. Eng., Bull. no. 148, p. 735, April, 1919.

Moffit, Fred H.

1326. The upper Chitina Valley, Alaska (U. S. Geol. Survey, Bull. 675, 1918) (abstract by R. W. Stone): Washington, Acad. Sci., Jour., vol. 9, no. 11, p. 320, June 4, 1919.

Monte-Flores, Maximo Macambyra.

1327. Rôle of bedrock in the distribution of the hydro-carbons: Mining and Metallurgy, no. 157, sec. 1, p. 47 (abstract), sec. 6, 3 pp., 2 figs., January, 1920, Discussion by M. R. Daly, Am. Inst. Min. and Met. Eng. [Trans., preprint no. 988], pp. 16-18, 1920.

Montessus de Ballore, F. de.

1328. Basis of the geologic theory of earthquakes: Seismol. Soc. America, Bull., vol. 9, no. 1, pp. 8-19, March, 1919.

Montijo, Fernando, jr.

1329. The Las Chipas mine [near Arizpe] in Sonora, Mexico: Min. and Sci. Press, vol. 121, pp. 58-60, 1 fig., July 10, 1920.

Montolieu, E.

1330. Informe técnico sobre un reconocimiento practicado en tierras de la hacienda "Motembo," Coralillo, Provincia de Santa Clara, en relación con informes recibidos por el Gobierno de la República sobre el hallazgo de extensos yacimientos de potasa [potash deposits, Santa Clara province, Cuba]: Cuba, Dirección Montes y Minas, Boletín de Minas, no. 6, pp. 17-23, 1920.

Moodie, Roy L.

1331. Bacteriologic and pathologic evidences in past geologic ages: Chicago Pathological Soc., Trans., vol. 10, no. 3, pp. 84-88, October 1, 1916.
1332. The influence of disease in the extinction of races: Science, new ser., vol. 45, pp. 63-64, January 19, 1917.
1333. Studies in paleopathology; general consideration of the evidence of pathological conditions found among fossil animals: Annals of Medical History, vol. 1, no. 4, pp. 374-393, 20 figs., New York, December, 1917.
1334. Pathologic lesions among extinct animals; a study of the evidences of disease millions of years ago: Surgical Clinics of Chicago, vol. 2, no. 2, pp. 318-331, 10 figs., April, 1918.
1335. On the parasitism of Carboniferous crinoids: Jour. Parasitology, vol. 4, no. 4, pp. 174-175, June, 1918. Abstract, Am. Soc. Zoologists, Proc., p. 34, December 27, 1917 (not seen); Anatomical Record, Philadelphia, vol. 14, no. 1, pp. 102-103, January 20, 1918.
1336. Studies in paleopathology; opisthotonos and allied phenomena among fossil vertebrates: Am. Naturalist, vol. 52, pp. 384-394, 8 figs., August-September, 1918.
1337. Studies in paleopathology; pathological evidences of disease among ancient races of man and extinct animals: Surgery, Gynecology, and Obstetrics, vol. 27, no. 5, pp. 498-510, 45 figs., Chicago, November, 1918.
1338. Paleopathology: Southern Medical Jour., vol. 12, no. 4, pp. 182-184, April, 1919.
1339. Opisthotonos: Science, new ser., vol. 50, pp. 275-276, September 19, 1919.
1340. Thread moulds and bacteria in the Devonian: Science, new ser., vol. 51, pp. 14-15, January 2, 1920.

Mook, Charles Craig.

- (with Osborn, Henry Fairfield). Characters and restoration of the sauropod genus *Camarasaurus* Cope: Am. Philos. Soc., Proc., vol. 58, no. 6, pp. 386-396, 1 pl., 3 figs., 1919.
- (with Osborn, Henry Fairfield). Reconstruction of the skeleton of the sauropod dinosaur *Camarasaurus* Cope (*Morosaurus* Marsh): Nat. Acad. Sci., Proc., vol. 6, no. 1, p. 15, January 15, 1920.

Moore, E. S.

1341. Iron deposits on the Belcher Islands, Hudson Bay: Canadian Min. Inst., Bull. no. 82, pp. 196-206, 4 figs., February, 1919; Trans., vol. 22, pp. 100-111, 4 figs. [1920].
1342. Ore deposits of Arctic Canada: Eng. and Min. Jour., vol. 110, no. 9, pp. 396-400, 8 figs., August 28, 1920.
- See also Wheeler, no. 1950.

Moore, Raymond C.

1343. The stratigraphy of the Kinderhook group in western Illinois and Missouri (abstract): Illinois Acad. Sci., Trans., vol. 9, p. 211 [1917].

Moore, Raymond C.—Continued.

1344. The Bend series of central Texas (with discussion): *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 217-241, 1919.
1345. Oil and gas resources of Kansas; Part I, General geology of oil and gas: Kansas, State Geol. Survey, Bull. 6 [pt. 1], 83 pp., 8 pls., 9 figs. [1920].
1346. Oil and gas resources of Kansas; Part 2, Geology of Kansas: Kansas, State Geol. Survey, Bull. 6 [pt. 2], 98 pp., 17 pls. (incl. maps), 12 figs., 1920.
1347. (and Elledge, Emmett R.). The oil and gas resources of Allen and Neosho counties, Kansas: Kansas State Geol. Survey, Bull., 6, pt. 5, 22 pp., 2 figs., 4 pls. (incl. map) [1920?].
1348. (and Boughton, Charles W.). Oil and gas resources of Wilson and Montgomery counties, Kansas: Kansas State Geol. Survey, Bull. 6, pt. 6, 32 pp., 3 figs., 4 pls. (incl. map) [1920?].
1349. Petroleum resources of Kansas: Mining and Metallurgy, no. 158, sec. 1, p. 43 (abstract), sec. 29, 11 pp., 1 fig., February, 1920.
1350. (and Haynes, Winthrop P.). An outcrop of basic igneous rock in Kansas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 2, pp. 183-187, 1920.
1351. The relation of the buried granite in Kansas to oil production: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 3, pp. 255-261, 5 figs., 1920.
(with Van Tuyl, Francis M.). Late Mississippian orogenic movements in North America (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 88-89, March 31, 1919.
See also Panyity, no. 1394.

Morgan, G. B.

1352. Areal geology of Wyoming [correlation table and production data]. On reverse of geological map of Wyoming. Published by G. B. Morgan, State Geologist, and C. S. Hill, Commissioner of Immigration, Cheyenne, Wyo. [1919].

Morse, Edward S.

1353. On certain fossil shells in the boulder clay of Boston Basin: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 157-165, 3 figs., March, 1920.

Morse, Roy R.

1354. Oil possibilities along the southern margin of the Black Hills, South Dakota (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 195, March 31, 1920.

Moses, Frederick G.

- (with Dub, George D.). Mining and preparing domestic graphite for crucible use: *U. S. Bur. Mines, Bull.* 112, 80 pp., 5 pls., 20 figs., 1920.

Mullenburg, G. A.

1355. Manganese deposits of Colorado: *Colorado Geol. Survey, Bull.* 15, 76 pp., 1 pl. (map), 1919.

Muir, John.

1356. Studies in the Sierra; no. 5, Postglacial denudation: *Overland Monthly*, vol. 13, pp. 393-402 (1874); *Sierra Club Bull.*, vol. 10, no. 4, pp. 414-428, 4 pls., 3 figs., January, 1919.
1357. Studies in the Sierra; no. 6, Formation of soils: *Sierra Club Bull.*, vol. 11, no. 1, pp. 69-85, 5 figs., January, 1920.

Mulholland, William.

1358. The earthquake problem in southern California: Seismol. Soc. America, Bull., vol. 10, no. 4, pp. 289-297, December, 1920.

Muñoz Lumbier, Manuel.

1359. Descripción histórica de la Red Seismológica Nacional: México, Inst. Geol., Bol. no. 18, 69 pp., illus., 1919.
1360. Algunos datos sobre las islas mexicanas para contribuir al estudio de sus recursos naturales: México, Inst. Geol., Anales no. 7, 56 pp., 9 pls., 1919.
1361. Los temblores de Guatemala: Boletín Minero, t. 7, nos. 1-2. Folleto de Divulgación no. 1, 4 pp., 1 pl., January-February, 1919.

Mylius, L. A.

1362. Oil and gas prospecting in parts of Clark, Coles, Edgar, Douglas, Vermilion, and Champaign counties: Illinois State Geol. Survey, Press Bulletin, 7 pp., 1 fig. (map), July 10, 1920.
1363. A restudy of the Staunton gas pool: Illinois State Geol. Survey, Extract from Bull. no. 44, 23 pp., 3 pls. (incl. maps), 1 fig., 1919. (with DeWolf, F. W.). A new Trenton field in Illinois: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 43-46, 1 fig., 1920.

Nash, James P.

1364. (and others). Road-building materials in Texas: Texas, Univ. Bull. no. 1839, 159 pp., 10 pls., July 10, 1918 [1920?].

Nason, Frank L. See Wheeler, no. 1950.

Nattress, Thomas.

1365. On the manner of occurrence of potassium nitrate in Oregon: Michigan Acad. Sci., 20th Ann. Rept., pp. 57-58, 1918.

Neal, Roy O.

1366. Petroleum hydrology applied to Mid-Continent field (with discussion by G. S. Rogers and R. Van A. Mills): Am. Inst. Min. Eng., Bull. no. 145, pp. 1-8, January, 1919; Bull. no. 147, pp. 603-606, March, 1919; Trans., vol. 61, pp. 565-579, 1920.

Nebel, Merle L.

1367. Brown County: Illinois State Geol. Survey, Bull. no. 40, pp. 21-50, 1 pl. (map), 13 figs., 1919.
1368. Goodhope and La Harpe quadrangles: Illinois State Geol. Survey, Bull. no. 40, pp. 51-67, 2 pls. (maps), 1 fig., 1919.
1369. The basal phases of the Duluth gabbro near Gabamichigami Lake, Minnesota, and its contact effects: Econ. Geology, vol. 14, no. 5, pp. 367-402, 4 pls., 3 figs., August, 1919.

Nelson, Wilbur A.

1370. Administrative report of State geologist, 1918: Tennessee State Geol. Survey, Resources of Tennessee, vol. 9, no. 1, pp. 3-22, January, 1919.
1371. Administrative report of the State Geologist, 1919: Tennessee State Geol. Survey, Bull. 23 (Pt. 1, Ann. Rept. 1919), pp. 7-29, 1920.
1372. Press bulletins for 1919: Probable oil structures in west Tennessee; Probable structure and geology in Reelfoot Lake district, Tennessee, and possibilities for finding oil and gas; Oil possibilities and structure in the western valley of Tennessee; Explorations for oil in Sumner County, Tenn.: Tennessee State Geol. Survey, Bull. 23 (Pt. 1, Ann. Rept. 1919), pp. 30-43, 1920.

Nelson, Wilbur A.—Continued.

1373. Notes on the Kentucky-Tennessee oil fields: Tennessee State Geol. Survey, Bull. 23 (Pt. 1, Ann. Rept. 1919), pp. 44-47, 1920.
(with Holbrook, E. A.). The coal pyrite resources of Tennessee and tests on their availability: Tennessee State. Geol. Survey, Resources of Tennessee, vol. 9, no. 1, pp. 60-70, January, 1919. Coal Age, vol. 15, pp. 1077-1079, June 12, 1919.

Newland, D. H.

1374. Magnetic iron ores of Clinton County, New York: Econ. Geology, vol. 15, no. 2, pp. 177-180, March, 1920.

Nishio, Keijiro.

1375. Native copper and silver in the Nonesuch formation, Michigan: Econ. Geol., vol. 14, no. 4, pp. 324-334, 1 pl., 1 fig., June, 1919.

Noble, L. F.

1376. Geologic history of the Bright Angel quadrangle, Arizona. Text and 1 fig. on back of topographic sheet, Bright Angel quadrangle, Arizona (Coconino County), U. S. Geol. Survey, 1918.

North, Frederick John.

1377. On *Springothyris* Winchell and certain Carboniferous Brachiopoda referred to *Spiriferina* D'Orbigny: Geol. Soc. London, Quart. Jour., vol. 76, pt. 2, pp. 162-227, 3 pls., 6 figs., November 30, 1920.

Northrop, John D.

1378. Petroleum in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 683-901, 2 figs., August 4, 1919.
1379. Natural gas and natural-gas gasoline in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 1051-1136, 6 figs., September 20, 1919.
1380. The petroleum resources of the world: Eng. and Min. Jour., vol. 108, pp. 953-955, 1 fig., December 27, 1919; vol. 109, pp. 34-38, 1 fig., January 3, 1920.

Norton, W. H.

1381. Wapsipinicon breccias of Iowa: Iowa Geol. Survey, vol. 27, pp. 355-547, 48 figs., 10 pls. [1920].

O'Connell, Marjorie.

1382. The Schrammen collection of Cretaceous Silicispongiae in the American Museum of Natural History: Am. Mus. Nat. Hist., Bull., vol. 41, pp. 1-261, 5 figs., 14 pls., map, August 1, 1919.
1383. Orthogenetic development of the costae in the Perisphinctinae: Am. Jour. Sci., 4th ser., vol. 48, pp. 450-460, 2 figs., December, 1919. Abstract, Geol. Soc. America, Bull., vol. 30, no. 1, p. 152, March 31, 1919.
1384. The Jurassic ammonite fauna of Cuba: Am. Mus. Nat. Hist., Bull., vol. 42, pp. 643-692, 8 figs., 5 pls., 1920.
1385. Further studies on the Jurassic of Cuba (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 136, March 31, 1920.
(with Brown, Barnum). Discovery of the Oxfordian in western Cuba (abstract): Geol. Soc. American, Bull., vol. 30, p. 152, March 31, 1919.

O'Connor, J. J.

1386. The latent iron-ore resources in Canada lying north of Lake Superior: Canadian Min. Jour., vol. 40, no. 50, pp. 952-953, December 17, 1919.

O'Harra, Cleophas C.

1387. Lignite coals and their utilization: Pahasapa Quart., vol. 8, no. 2, pp. 16-35, illus., February, 1919.

1388. The Badlands: Pahasapa Quart., vol. 9, no. 4, pp. 207-213, 7 figs., June, 1920.

1389. The White River Badlands: South Dakota School of Mines, Bull. no. 13, 181 pp., 75 figs., 96 pls. (incl. map), November, 1920.

O'Neill, J. J.

1390. Preliminary report on the economic geology of Hazleton district, British Columbia: Canada, Geol. Survey, Mem. 110, 51 pp., 10 pls., 5 figs., 3 maps, 1919.

1391. The platinum situation in Canada, 1918: Canada, Geol. Survey, Summ. Rept., 1918, Part G, pp. 1-15, map, 1919.

1392. Deposits of native copper in Arctic Canada: Canadian Min. Inst., Trans., vol. 22, pp. 406-416, 3 figs. [1920]. Min. and Sci. Press, vol. 118, pp. 807-811, 5 figs., June 14, 1919.

1393. Salmon River district, Portland Canal mining division, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 7-12, 1920.

Ontario, Bureau of Mines.

1394. Twenty-eighth annual report of the Ontario Bureau of Mines, 1919, being vol. XXVIII, Part I. 254 pp., figs. and map, Toronto, 1919.

Ontario, Department of Mines.

1395. Twenty-ninth annual report of the Ontario Department of Mines, being vol. 29, part I, 1920. 263 pp., figs. and maps, Toronto, 1920.

Ordóñez, Ezequiel.

1396. Petróleo en el sur de Tamaulipas: Soc. cient. "Antonio Alzate," Mem. y Rev., t. 38, nos. 5-8, pp. 257-269, June 1919.

1397. Oil in southern Tamaulipas, Mexico (with discussion by V. R. Garfías and E. DeGolyer): Am. Inst. M'n. and Met. Eng., Trans., vol. 61, pp. 532-543, 1920.

Ortega, Pablo.

1398. (and Huerta, Santiago de la). El carbón de piedra, el petróleo, el asfalto, los betunes, y el gas natural de Cuba: Cuba, Dirección de Montes y Minas, Bol. Bibliog. no. 1, 23 pp., La Habana, 1919.

Osborn, C. C.

1399. Peat in the Dismal Swamp, Virginia and North Carolina: U. S. Geol. Survey, Bull. 711, pp. 41-59, 3 pls. (incl. map), October 29, 1919. Abstract, Washington Acad. Sci. Jour., vol. 10, no. 20, p. 574, December 4, 1920.

1400. Peat in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 331-356, 1 fig., 1 pl. (map), November 24, 1919.

1401. Asphalt and allied substances in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 447-494, 3 figs., 1 pl. (map), March 31, 1920.

Osborn, Henry Fairfield.

1402. Samuel Wendell Williston: Science, new ser., vol. 49, pp. 274-278, March 21, 1919.

1403. Memorial of Samuel Wendell Williston: Geol. Soc. America, Bull., vol. 30, no. 1, pp. 66-76, port., March 31, 1919.

Osborn, Henry Fairfield—Continued.

1404. Seventeen skeletons of *Moropus*; probable habits of the animal: Nat. Acad. Sci., Proc., vol. 5, no. 7, pp. 250-252, 1 fig., July 15, 1919.
1405. *Paleomastodon*, the ancestor of the long-jawed mastodons only: Nat. Acad. Sci., Proc., vol. 5, no. 7, pp. 265-266, 1 fig., July 15, 1919.
1406. *Camarasaurus*, *Amphicoelias*, and other sauropods of Cope: Geol. Soc. America, Bull., vol. 30, pp. 379-388, September 30, 1919.
1407. (and Mook, Charles Craig). Characters and restoration of the sauropod genus *Camarasaurus* Cope: Am. Philos. Soc., Proc., vol. 58, no. 6, pp. 386-396, 1 pl., 3 figs., 1919.
1408. (and Mook, Charles Craig). Reconstruction of the skeleton of the sauropod dinosaur *Camarasaurus* Cope (*Morosaurus* Marsh): Nat. Acad. Sci., Proc., vol. 6, no. 1, p. 15, January 15, 1920.
1409. The hall of the age of man in the American Museum: Natural History, vol. 20, no. 3, pp. 229-246, 14 figs., May-June, 1920.

Osborn, H. S.

1410. Prospector's field book and guide in the search for and the easy determination of ores and other useful minerals. 9th ed., revised by M. W. von Bernewitz, 364 pp., 56 figs., New York, Henry Carey Baird & Co., 1920.

Overbeck, R. M.

1411. Geology and mineral resources of the west coast of Chichagof Island [southeastern Alaska]: U. S. Geol. Survey, Bull. 692, pp. 91-136, map, 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 20, p. 632, December 4, 1919.
1412. Nickel deposits in the lower Copper River valley, Alaska: U. S. Geol. Survey, Bull. 712, pp. 91-98, 1 fig. (map), 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 10, no. 16, p. 472, October 4, 1920.
1413. Placer mining in the Tolovana district, Alaska: U. S. Geol. Survey, Bull. 712, pp. 177-184, 1920. Abstract by J. D. Sears, Washington Acad. Sci., Jour., vol. 10, no. 18, p. 522, November 4, 1920.

Pack, Frederick J.

1414. Wonders of Utah geology: Utah, Univ., Bull., vol. 10, no. 12, 24 pp., illus., 1919.

Pack, R. W.

1415. The Sunset-Midway oil field, California; Part I, Geology and oil resources: U. S. Geol. Survey, Prof. Paper 116, 179 pp., 45 pls. (incl. maps), 15 figs., 1920.

Packard, Earl L.

- (with Smith, Warren Dupre). The salient features of geology of Oregon: Jour. Geology, vol. 27, no. 2, pp. 79-120, 3 figs., 1 pl., 1919. Oregon, Univ., Bull. vol. 16, no. 7, pp. 79-120, 3 figs., 1 pl., July, 1919.

Paige, Sidney.

1416. United States Geological Survey as a civic institution during the war (abstract): Geol. Soc. America, Bull., vol. 30, pp. 78-79, March 31, 1919.

Palache, Charles.

1417. The two-circle goniometer: *Am. Mineralogist*, vol. 5, no. 2, pp. 23-33, 3 figs., February, 1920.
1418. The gnomonic projection: *Am. Mineralogist*, vol. 5, no. 4, pp. 67-80, 17 figs., April, 1920.
1419. Further notes on crystal drawing: *Am. Mineralogist*, vol. 5, no. 5, pp. 96-99, 2 figs., May, 1920.
1420. The Goldschmidt two-circle method; calculations in the isometric system: *Am. Mineralogist*, vol. 5, no. 6, pp. 112-116, 1 fig., June, 1920.
1421. The Goldschmidt two-circle method; calculations in the tetragonal system: *Am. Mineralogist*, vol. 5, no. 7, pp. 129-132, 3 figs., July, 1920.
1422. The Goldschmidt two-circle method; calculations in the hexagonal system: *Am. Mineralogist*, vol. 5, no. 8, pp. 143-149, 4 figs., August, 1920.
1423. (and Shannon, Earl V.). Higginsite, a new mineral of the olivenite group [Bisbee, Arizona]: *Am. Mineralogist*, vol. 5, no. 9, pp. 155-157, 2 figs., September, 1920.
1424. The Goldschmidt two-circle method; calculations in the orthorhombic system: *Am. Mineralogist*, vol. 5, no. 9, pp. 158-159, 1 fig., September, 1920.
1425. Illustration of the orthorhombic system; measurements and calculations on higginsite: *Am. Mineralogist*, vol. 5, no. 9, pp. 159-164, 2 figs., September, 1920.
1426. The Goldschmidt two-circle method; calculations in the monoclinic system, illustrated by monazite from Weymouth, Massachusetts: *Am. Mineralogist*, vol. 5, no. 10, pp. 173-181, 5 figs., October, 1920.
1427. The Goldschmidt two-circle method; introduction to the triclinic system: *Am. Mineralogist*, vol. 5, no. 11, pp. 185-190, 4 figs., November, 1920.

Palmer, Andrew H.

1428. California earthquakes during 1918: *Seismol. Soc. America, Bull.*, vol. 9, no. 1, pp. 1-7, 1 pl., March, 1919.
1429. California earthquakes during 1919: *Seismol. Soc. America, Bull.*, vol. 10, no. 1, pp. 1-8, 1 pl., March, 1920.
1430. Recent California earthquakes: *Sci. Monthly*, vol. 10, no. 6, pp. 529-552, 17 figs., June, 1920.

Palmer, Harold S.

1431. New graphic method for determining the depth and thickness of strata and the projection of dip (U. S. Geol. Survey, Prof. Paper 120, pp. 123-128, 1918) (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 8, p. 228, April 19, 1919.
1432. Graphic determination of dip components where dips are measured in feet per mile: *Econ. Geology*, vol. 14, no. 4, pp. 346-348, 1 fig., June, 1919.
1433. Radian measures in plane-table mapping: *Econ. Geology*, vol. 15, no. 3, pp. 266-267, April-May, 1920.
1434. Ground water in the Norwalk, Suffield, and Glastonbury areas, Connecticut: U. S. Geol. Survey, Water-Supply Paper 470, 171 pp., 12 pls. (incl. maps), 18 figs., 1920.



Panyity, L. S.

1435. Prospecting for oil and gas. 249 pp., 128 figs., 28 tables, New York, John Wiley & Sons, 1920. Review by Raymond C. Moore, *Econ. Geology*, vol. 15, no. 4, pp. 356-359, June, 1920.

1436. Lithology of Berea sand in southeastern Ohio and its effect on production: *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 478-481, 2 figs., 1920.

See also Bownocker, no. 184.

Papish, Jacob.

1437. Sulphur dioxide as a source of volcanic sulphur: *Indiana Acad. Sci., Proc.*, 1918, pp. 170-171, 1919.

Pardee, J. T.

1438. Geology and mineral deposits of the Colville Indian Reservation, Washington (U. S. Geol. Survey, Bull. 677, 1918) (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 11, p. 315, June 4, 1919.

1439. Some manganese deposits in Madison County, Montana (U. S. Geol. Survey, Bull. 690, pp. 131-143, 1918) (abstract by R. W. Stone): *Washington Acad. Sci. Jour.*, vol. 9, no. 2, pp. 48-49, January 19, 1919.

1440. Manganese deposits of the northwestern States (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 13, p. 385, July 19, 1919.

1441. (and Jones, E. L., jr.). Deposits of manganese ore in Nevada: U. S. Geol. Survey, Bull. 710, pp. 209-248, 1 pl. (map), 2 figs., March 15, 1920. Abstract, *Washington Acad. Sci., Jour.*, vol. 10, no. 20, p. 573, December 4, 1920.

See also Leffingwell, no. 1033.

Paredes, Trinidad.

1442. Exploración geológica de una parte del Estado de Guerrero [México]: *Bol. Minero*, t. 6, no. 4, pp. 481-498, October, 1918.

1443. Algunos criaderos de fierro en el Estado de Hidalgo: *Boletín Minero*, t. 8, no. 3-4, pp. 338-351, map, September-October, 1919.

1444. (and García, J. Aurelio). Estudio de la Laguna de Cuyutlán, Estado de Colima [México]: *Boletín Minero*, t. 8, nos. 5-6, pp. 584-597, map, November-December, 1919.

1445. Memoria relativa al objeto, historia y desarrollo del Instituto Geológico Nacional: *Soc. cient. "Antonio Alzate," Mem.*, t. 35, nos. 1-2, pp. 21-50, 12 pls., March, 1920.

1446. El petróleo en algunas islas del Golfo de California: *Boletín del Petróleo*, vol. 9, no. 5, pp. 403-415, 5 pls. (incl. maps), May, 1920.

1447. El carbón y la grafito del Estado de Sonora: *Boletín Minero*, t. 9, nos. 5-6, pp. 608-613, 1 pl., May-June, 1920.

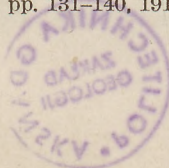
Parks, Henry M.

1448. Biennial report of the Oregon Bureau of Mines and Geology for 1917-18. 30 pp. [December, 1918].

1449. Biennial report of the Oregon Bureau of Mines and Geology for 1919-20. 26 pp. [December, 1920].

Parks, William A.

1450. The great fossil reptiles of Alberta: *Hamilton Assoc., Jour. and Proc.*, no. 29, pp. 131-140, 1919.



Parks, William A.—Continued.

1451. Preliminary description of a new species of trachodont dinosaur of the genus *Kritosaurus*: Roy. Soc. Canada, Proc. and Trans., 3d ser., vol. 13, sec. 4, pp. 51-59, 4 pls., 1920.

1452. The osteology of the trachodont dinosaur *Kritosaurus incurvimanus*: Toronto, Univ., Studies, Geol. Series no. 11, 76 pp., 22 figs., 7 pls., 1920.

Parsons, A. L.

1453. Calculation in the triclinic system, illustrated by anorthite: Am. Mineralogist, vol. 5, nos. 11 and 12, pp. 190-194, 198-207, 3 figs., November and December, 1920.

(with Knight, C. W., and others). Abitibi-Night Hawk gold area, District of Timiskaming: Ontario Bur. Mines, 28th Ann. Rept., vol. 28, pt. 2, pp. 1-70, 50 figs., map, 1919.

Patton, Horace B.

1454. Geology and ore deposits of the Platoro-Summitville mining district, Colorado: Colorado Geol. Survey, Bull. 13, 122 pp., 40 pls. (incl. maps), 2 figs., 1917 [1918].

Patty, Ernest N.

1455. Dominant features controlling ore deposits of Washington: Eng. and Min. Jour., vol. 110, no. 10, pp. 467-470, 3 figs., September 4, 1920.

Pearce, J. Newton.

- (with Kay, George F.). The origin of gumbotil: Jour. Geology, vol. 28, no. 2, pp. 89-125, 1 fig. (map), February-March, 1920.

Pearce, N. C.

1456. Oil in the western provinces [of Canada]: Canadian Min. Jour., vol. 40, pp. 673-676, 3 figs., September 10, 1919.

1457. Larder Lake district, northern Ontario: Canadian Min. Jour., vol. 40, pp. 693-695, 2 figs., September 17, 1919.

Pearson, P. H.

1458. Surface marks of oil deposits. 74 pp., 1 fig., published by P. H. Pearson, Washington, D. C., copyright 1920.

Peck, Frederick B.

1459. Occurrence and origin of white clays at Saylorsburg, Monroe County, Pennsylvania (abstract): Geol. Soc. America, Bull., vol. 30, no. 1, p. 96, March 31, 1919.

Penrose, R. A. F., jr.

1460. Radium and uranium; their ores and occurrence in nature: New York State Mus. Bull., nos. 207, 208, pp. 199-208, 1919.

Perini, V. C., jr.

1461. (and Collins, M. J.). Anticlines in Routt and Moffat counties: Colorado Geol. Survey, Bull. 24, pp. 7-46, 10 figs., 1 pl. (map), 1920.

(with Crawford, R. D., and Willson, K. M.). Some anticlines of Routt County, Colorado: Colorado Geol. Survey, Bull. 23, 61 pp., 10 figs., 3 pls. (incl. map), 1920.

(with Coffin, R. C., and Collins, M. J.). Some anticlines of western Colorado: Colorado Geol. Survey, Bull. 24, 61 pp., 13 figs., 2 pls. (maps), 1920.

Perkins, Edward H.

1462. The origin of the Dighton conglomerate of the Narragansett basin of Massachusetts and Rhode Island: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 61-75, 1 fig., January, 1920.

Perkins, George H.

1463. Report of the State geologist on the mineral industries and geology of Vermont. 1917-1918: Eleventh of this series. 247 pp., 18 pls., 10 figs. [1919].
1464. Physiography of Vermont: Vermont, State Geologist, 11th Rept., pp. 1-44 [1919].
1465. The physiography of Vermont: *Science*, new ser., vol. 49, pp. 77-81, January 24, 1919.
1466. The geology of Mill Stone hill [Barre, Vermont]: Vermont Soc. Engineers, Proc., pp. 6-10, October 8, 1920.

Perrine, Irving. See Woodruff, no. 2034.

Peterson, O. A.

1467. Report upon the material discovered in the upper Eocene of the Uinta Basin by Earl Douglass in the years 1908-1909, and by O. A. Peterson in 1912: *Carnegie Mus., Annals*, vol. 12, nos. 2-4, pp. 40-168, 14 pls., 19 figs., October, 1919.
1468. The American diceratheres: *Carnegie Mus., Mem.*, vol. 7, no. 6, pp. 399-476, 10 pls., 37 figs., July, 1920.

Phalen, W. C.

1469. Salt resources of the United States: *U. S. Geol. Survey, Bull.* 669, 284 pp., 17 pls. (incl. maps), 16 figs., 1919. Abstract by R. W. Stone, *Washington Acad. Sci., Jour.*, vol. 9, no. 19, p. 600, November, 1919.
1470. The magnesite industry in the United States: *Min. and Sci. Press*, vol. 119, pp. 295-298, 5 figs., August 30, 1919.

Picher, R. H.

1471. Road materials in a portion of Vaudreuil County, Quebec, and along the St. Lawrence River from the Quebec boundary to Cardinal, Ontario: *Canada. Geol. Survey, Mem.* 106, 12 pp., 1918.
1472. Report on road materials along the St. Lawrence River, from the Quebec Boundary line to Cardinal, Ontario: *Canada, Mines Branch, Bull.* no. 32, 65 pls., map, 1920.

Pirsson, Louis V.

1473. Rock classification for engineering: *Econ. Geology*, vol. 14, no. 3, pp. 264-266, 1 fig., May, 1919.
1474. A textbook of geology . . . Part I, Physical geology. 2d ed., 470 pp., 319 figs., map, New York, John Wiley & Sons, 1920.

Plummer, Frederick Byron.

1475. Preliminary paper on the stratigraphy of the Pennsylvanian formations of north-central Texas (with discussion): *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 132-150, 3 figs., 1919.

Pogue, Joseph E.

1476. Geology as a basis of citizenship (abstract): *Geol. Soc. America, Bull.*, vol. 30, p. 77, March 31, 1919.
(with Gilbert, Chester E.). The mineral resources of the United States; the energy resources of the United States, a field for reconstruction: *U. S. Nat. Mus., Bull.* 102, vol. 1, 165 pp., 8 pls., 15 figs., 1919.

Poitevin, Eugene.

1477. Crystallography of some Canadian minerals; albite, titanite, scapolite, and polycrase: *Am. Mineralogist*, vol. 4, no. 2, pp. 11-13, 2 figs., February, 1919.
1478. Crystallography of some Canadian minerals; stephanite, epidote, and calamine: *Am. Mineralogist*, vol. 4, no. 3, pp. 22-25, 3 figs., March, 1919.
1479. Crystallography of some Canadian minerals; axinite: *Am. Mineralogist*, vol. 4, no. 4, pp. 32-36, 5 figs., April, 1919.
1480. Crystallography of some Canadian minerals; cerusite: *Am. Mineralogist*, vol. 4, no. 5, pp. 56-58, 8 figs., May, 1919.

Porter, Mary W.

1481. Practical crystal drawing: *Am. Mineralogist*, vol. 5, no. 5, pp. 89-95, 4 figs., May, 1920.

Ports, P. L.

- (with Shaw, E. W.). Natural gas resources available to Dallas and other cities of central north Texas: *U. S. Geol. Survey, Bull.* 716, pp. 55-89, 2 pls. (incl. maps), 10 figs., 1920.

Posnjak, Eugen.

1482. (and Merwin, H. E.). The hydrated ferric oxides: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 311-348, 5 figs., May, 1919.
- (with Merwin, H. E.). The iron hydroxide minerals (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 4, pp. 108-109, February, 1919.

Powers, Sidney.

1483. The Sabine uplift, Louisiana: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 2, pp. 117-136, 2 figs., 1920.
1484. The Butler salt dome, Freestone County, Texas: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 127-142, 2 figs., February, 1920.
1485. A lava tube at Kilauea: *Hawaiian Volcano Observatory, Monthly Bull.*, vol. 8, no. 3, pp. 46-49, March, 1920.
1486. Notes on Hawaiian petrology: *Am. Jour. Sci.*, 4th ser., vol. 50, pp. 256-280, 3 figs., October, 1920.
- (with Hopkins, Oliver B.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 24 N., Rs. 11 and 12 E: *U. S. Geological Survey, Bull.* 686, pp. 237-253, 4 pls. (incl. map), 1919.
- See also Miser, no. 1277.

Pratt, Joseph Hyde.

1487. Biennial report of the State geologist, 1917-1918: *North Carolina Geol. and Econ. Survey*, 110 pp., Raleigh, 1919.
1488. (and Berry, Miss H. M.). The mining industry in North Carolina during 1913-17, inclusive: *North Carolina Geol. and Econ. Survey, Econ. Paper no. 49*, 170 pp., 1 pl., 1919.

Pratt, Wallace E.

1489. Geologic structure and producing areas in north Texas petroleum fields (with discussion): *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 44-70, 1919.
- See also Hackford, no. 728; Hager, no. 730; Washburne, no. 1955.

Prest, Walter H.

1490. On the nature and origin of the eskers of Nova Scotia: *Nova Scotian Inst. Sci., Proc. and Trans.*, vol. 14, part 4, pp. 371-393, 1919.

Prettyman, T. M.

- (with Liddle, R. A.). Geology and mineral resources of Crockett County with notes on the stratigraphy, structure, and oil prospects of the central Pecos Valley: Texas, Univ., Bull., no. 1857, 97 pp., 4 pls. (incl. maps), 6 figs., October 10, 1918 [1920].

Price, George McCreedy.

1491. Geology. In Geography and geology, Modern American education, vol. 3, pp. 417-524, 37 figs., American Educational Institute, Philadelphia, 1920.

Price, W. Armstrong.

1492. Notes on the paleontology of Webster County; Invertebrate fossils from the Pottsville series: West Virginia Geol. Survey, Webster County, pp. 544-615, 2 figs., 2 pls., 1920.

1493. A Pocono brachiopod fauna: Science, new ser., vol. 51, pp. 146-147 February 6, 1920.

1494. Hydrozoan affinities of *Serpulites* Sowerby (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 210, March 31, 1920.

1495. Carbon ratios in Carboniferous coals of Oklahoma and their relation to petroleum (discussion): Econ. Geology, vol. 15, no. 7, pp. 610-611, November, 1920.

- (with Swartz, C. K., and Bassler, Harvey). Coal measures of Maryland: Geol. Soc. America, Bull., vol. 30, no. 4, pp. 567-596, 2 pls., 1 fig., December 31, 1919; abstract, no. 1, p. 154, March 31, 1919.

Prior, Charles E.

1496. Notes on the Salmon River mining district [northwestern British Columbia]: Min. and Sci. Press, vol. 121, pp. 518-520, 3 figs., October 9, 1920.

Prior, G. T.

1497. On the chemical composition of the meteorites Amana (= Homestead) and Eagle Station [Iowa and Kentucky]: Mineral. Mag., vol. 18, pp. 173-179, August, 1918.

Prouty, W. F.

1498. Further evidence of the age of the crystalline and semicrystalline rocks in Alabama (abstract): Geol. Soc. America, Bull., vol. 30, pp. 113-114, March 19, 1919.

1499. Crystalline graphite deposits of Alabama (abstract): Geol. Soc. America, Bull., vol. 30, pp. 112-113, March 31, 1919.

1500. Notes on the geology of a portion of Clay County, Alabama (abstract): Elisha Mitchell Sci. Soc., Jour., vol. 36, nos. 1-2, p. 4, September, 1920.

Purdue, A. H.

- (with Miser, Hugh D.). Asphalt deposits and oil conditions in southwestern Arkansas (U. S. Geol. Survey, Bull. 691, pp. 271-292, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 4, p. 104, February 19, 1919.

Purdy, Wesley.

1501. A summary of the Canadian foothills belt: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 249-254, 1920.

Quirke, Terence T.

1502. The Richardton [North Dakota] meteorite: Science, new ser., vol. 49, pp. 92-93, January 24, 1919.

Quirke, Terence T.—Continued.

- 1503. The Richardton [North Dakota] meteorite: *Jour. Geology*, vol. 27, no. 6, pp. 431-448, 2 figs., September-October, 1919.
- 1504. Metallic copper in a meteorite vein: *Econ. Geology*, vol. 14, no. 8, pp. 619-624, 1 pl., December, 1919.
- 1505. An analysis of the process of thrust faulting (abstract): *Science*, new ser., vol. 51, p. 519, May 21, 1920.
- 1506. Concerning the process of thrust faulting: *Jour. Geology*, vol. 28, no. 5, pp. 417-438, 7 figs., July-August, 1920.

Ransome, Frederick Leslie.

- 1507. The copper deposits of Ray and Miami, Arizona: U. S. Geol. Survey, Prof. Paper 115, 192 pp., 54 pls. (incl. maps), 29 figs., 1919.
 - 1508. Quicksilver in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 367-424, 2 pls. (maps), March 18, 1919.
 - 1509. Quicksilver in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 143-178, 1 fig., October 31, 1919.
 - 1510. The functions and ideals of a national geological survey: *Science*, new ser., vol. 51, pp. 173-180, 201-207, February 20 and 27, 1920. *Washington Acad. Sci., Jour.*, vol. 10, no. 4, pp. 85-109, February 19, 1920. *Smithsonian Institution, Ann. Rept.*, 1919, pp. 261-280, 1921. Abstract, *Eng. and Min. Jour.*, vol. 109, pp. 279-280, January 24, 1920.
 - 1511. Geologists as expert witnesses: *Econ. Geology*, vol. 15, no. 4, pp. 339-349, June, 1920.
- (with Jones, E. L., jr.). Deposits of manganese ore in Arizona. U. S. Geol. Survey, Bull. 710, pp. 93-184, 6 pls. (incl. maps), 8 figs., January 29, 1920.

Rathbun, Mary J.

- 1512. West Indian Tertiary decapod crustaceans: *Carnegie Inst. Washington*, Pub. 291, pp. 157-184, 9 pls., 1919.
- 1513. Additions to West Indian Tertiary decapod crustaceans: *U. S. Nat. Mus., Proc.*, vol. 58, pp. 381-384, 1 pl., 1920.

Raymond, Percy E.

- 1514. The pygidium of the trilobite: *Geol. Mag.*, vol. 57, pp. 22-25, January, 1920.
- 1515. Middle Ordovician of Virginia and Tennessee (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 137, March 31, 1920.
- 1516. Paleontological collections in the vicinity of Boston (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 205, March 31, 1920.
- 1517. Trilobites as ancestors (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 214-215, March 31, 1920.
- 1518. Some new Ordovician trilobites: *Harvard Coll., Mus. Comp. Zool., Bull.*, vol. 64, no. 2, pp. 273-296, July, 1920.
- 1519. Phylogeny of the Arthropoda with especial reference to the trilobites: *Am. Naturalist*, vol. 54, pp. 398-413, September-October, 1920.
- 1520. The appendages, anatomy, and relationships of trilobites: *Connecticut Acad. Arts and Sci., Mem.*, vol. 7, 169 pp., 11 pls., 46 figs., December, 1920. [Foreword by Charles Schuchert.]
- 1521. Report on invertebrate paleontology: *Harvard Coll., Mus. Comp. Zool., Ann. Rept.*, 1919-1920, pp. 30-31, 1920.

Reber, Louis E., jr.

1522. Geology and ore deposits of Jerome district [Yavapai County, Arizona]: Mining and Metallurgy, no. 161, sec. 1, pp. 25-27, May, 1920, (abstract); Am. Inst. Min. and Met. Eng., Trans. [preprint no. 984], 24 pp., 1 fig. (map), 1 pl. [1920]. Abstract, Eng. and Min. Jour., vol. 110, no. 12, p. 566, September 18, 1920.

Reed, Burleigh B.

1523. (and Knight, Nicholas). Some American dolomites: Iowa Acad. Sci., Proc., vol. 26, pp. 377-378 [1920].

Reeder & Company.

1524. The Appalachian oil field. 21 pp., New York, 1920.

Reeside, John B., jr.

1525. Some American Jurassic ammonites of the general *Quenstedticeras*, *Cardioceras*, and *Amoeboceras*, family *Cardioceratidae*: U. S. Geol. Survey, Prof. Paper 118, 64 pp., 24 pls., 1 fig., 1919.

Reeves, Frank.

- (with Bowen, C. F., and others). Structure and oil and gas resources of the Osage Reservation, Oklahoma; Tps. 21-23 N., Rs. 6-7 E., and Tps. 23-25 N., Rs. 3-5 E.: U. S. Geol. Survey, Bull. 686, pp. 279-301, 3 pls. (incl. maps), 1919.

Reeves, John R.

1526. The Anderson esker [Indiana]: Am. Jour. Sci., 4th ser., vol. 50, pp. 65-68, 1 fig., July, 1920.
1527. Oil shales of Indiana: Eng. and Min. Jour., vol. 110, no. 20, pp. 954-955, November 13, 1920.

Reger, David B.

1528. Webster County and portion of Mingo district, Randolph County, south of Valley Fork of Elk River. West Virginia Geol. Survey [County reports], 682 pp., 24 figs., 35 pls., 2 maps, 1920.
1529. Recent oil and gas developments in West Virginia: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 27-31, 1920.
See also White, no. 2004; Willis, no. 2047.

Reid, Harry Fielding.

1530. (and Taber, Stephen). Recent earthquakes of Porto Rico (abstract): Geol. Soc. America, Bull., vol. 30, no. 1, pp. 83-84, March 31, 1919.
1531. (and Taber, Stephen). The Porto Rico earthquake of 1918, with descriptions of earlier earthquakes: U. S., 66th Cong., 1st Sess., H. R. Doc. no. 269, 74 pp., 8 pls., 1919.
1532. (and Taber, Stephen). The Porto Rico earthquake of October-November, 1918: Seismol. Soc. America, Bull., vol. 9, no. 4, pp. 95-127, 8 pls., December, 1919.
1533. (and Taber, Stephen). The Virgin Islands earthquakes of 1867-1868: Seismol. Soc. America, Bull., vol. 10, no. 1, pp. 9-30, 3 figs., March, 1920.
1534. The distribution of land and water on the earth: Am. Philos. Soc., Proc., vol. 59, no. 4, pp. 313-324, 3 figs., 1920.
1535. The problems of seismology: Nat. Acad. Sci., Proc., vol. 6, no. 10, pp. 555-561, October 15, 1920. Nat. Research Council, Reprint and Circular Ser., no. 11, pp. 555-561, 1920.

Reinecke, Leopold.

1536. Road materials in the vicinity of Regina, Saskatchewan: Canada, Geol. Survey, Mem. 107 (geol. ser. 90), 28 pp., 2 pls., 3 figs., map, 1919.

1537. Undeveloped mineral resources of the Clinton district, B. C.: Canadian Min. Inst., Bull. no. 88, pp. 871-876, 1 fig., August, 1919; no. 89, pp. 940-950, 3 figs., September, 1919; no. 90, pp. 1039-1049, October, 1919; Trans., vol. 22, pp. 341-367, 6 figs. [1920].

1538. Mineral deposits between Lillooet and Prince George, British Columbia: Canada, Geol. Survey, Mem. 118, 129 pp., 18 figs., 17 pls., 1920.

Reinhard, Max.

1539. Interprétation tectonique de la région pétrolifère de la vallée de Santa Clara en Californie et considérations théoriques sur les gîtes de pétrole: Arch. sci. phys. nat., 5th ser., vol. 1, pp. 63-78, 2 pls. (incl. map), January-February, 1919.

Resser, Charles E.

1540. Bibliographic studies of the Cambrian (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 213, March 31, 1920.

Rhodes, E. O.

1541. The Paint Creek uplift: Kentucky, Dept. Geology and Forestry, Ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 3, pp. 243-250, map, October 1, 1919.

Rice, Marion.

1542. Petrographic notes on the ore deposits of Jerome, Arizona: Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 60-65, 9 figs., 1920.

Rich, John L.

1543. A graphical method of determining the average inclination of a land surface from a contour map: Illinois Acad. Sci., Trans., vol. 9, pp. 195-199 [1917].

Richardson, Charles Henry.

1544. The Ordovician terranes of central Vermont: Vermont, State Geologist, 11th Rept., pp. 45-51, 3 pls. [1919].

1545. (and Camp, Samuel H.). The terranes of Northfield, Vermont: Vermont State Geologist, 11th Rept., pp. 99-119, 6 pls. (incl. map) [1919].

1546. The terranes of Roxbury, Vermont: Vermont, State Geologist, 11th Rept., pp. 120-140, 4 pls., 1 fig. [1919].

1547. The glass sands of Kentucky: Kentucky Geol. Survey, Ser. 6, vol. 1, 149 pp., 23 figs., 1920.

Richardson, G. B. See Butler, no. 255.

Richardson, W. D.

1548. The singing sands of Lake Michigan: Science, new ser., vol. 50, pp. 493-495, November 28, 1919.

Rickard, T. A.

1549. Horace V. Winchell, mining geologist: Min. and Sci. Press, vol. 118, pp. 211-219, 9 figs., February 15, 1919.

1550. Willet G. Miller, Canadian geologist: Min. and Sci. Press, vol. 118, pp. 779-786, June 7, 1919.

1551. The Bunker Hill enterprise, V; the geology and mineralogy of the lode [Coeur d'Alene district, Idaho]: Min. and Sci. Press, vol. 120, pp. 261-268, 5 figs., February 21, 1920.

Rickard, T. A.—Continued.

1552. (Editor). Rossiter Worthington Raymond; a memorial published by the American Institute of Mining and Metallurgical Engineers. 95 pp., New York, 1920.

Riddell, C. W.

- (with Clark, W. O.). Exploratory drilling for water and use of ground water for irrigation in Steptoe Valley, Nevada; with an introduction by O. E. Meinzer: U. S. Geol. Survey, Water-Supply Paper 467, 70 pp., 6 figs., 6 pls. (incl. maps), 1920.

Ries, H.

1553. The occurrence of high-grade American clays and the possibility of their further development: Am. Ceramic Soc., Jour., vol. 1, no. 7, pp. 446-467, 16 figs., July, 1918.
1554. High-grade clays of the United States (abstract): Geol. Soc. America, Bull., vol. 30, pp. 95-96, March 31, 1919.
1555 (and Somers, R. E.). The clays and shales of Virginia west of the Blue Ridge: Virginia Geol. Survey, Bull. no. 20, 118 pp., 8 figs. (incl. maps), 14 pls. (incl. map), 1920.

Roberts, John R.

1556. The North Texas oil fields: Eng. and Min. Jour., vol. 109, pp. 964-965, April 24, 1920.

Robertson, William Fleet.

1557. Annual report of the minister of mines [of British Columbia] for the year ending 31st December, 1918. . . 510 pp., pls., maps, Victoria, B. C., 1919.
1558. Annual report of the minister of mines [of British Columbia] for the year ending 31st December, 1919. . . 393 pp., pls., figs., maps, Victoria, B. C., 1920.

Robinson, Heath M.

1559. (and Mills, R. V. A.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 27 N., R. 11 E.: U. S. Geol. Survey Bull. 686, pp. 255-277, 2 pls. (incl. map), 3 figs., 1919.
1560. (and Mills, R. V. A.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 27 N., R. 10 E.: U. S. Geol. Survey, Bull. 686, pp. 303-327, 3 pls. (incl. map), 2 figs., 1919.
(with Goldman, Marcus I.). Structure and oil and gas resources of the Osage Reservation, Oklahoma; T. 28 N., Rs. 11 and 12 E.: U. S. Geol. Survey, Bull. 686, pp. 359-394, 4 pls. (incl. maps), 2 figs., 1920.

Robinson, H. H. See Barrell, no. 74.

Rockwell, F. G.

- (with Shannon, C. W.). New oil and gas development in Oklahoma: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 277-281, 1920.

Roeschlaub, H. M.

1561. Possibilities of the oil-shale industry: Eng. and Min. Jour., vol. 108, pp. 572-576, 3 figs., October 4, 1919.

Rogers, Austin F.

1562. Colemanite pseudomorphous after inyoite from Death Valley, California: Am. Mineralogist, vol. 4, no. 11, pp. 135-139, 2 figs., 1 pl., November, 1919.

Rogers, Austin F.—Continued.

1563. An interesting occurrence of manganese minerals near San Jose, California: *Am. Jour. Sci.*, 4th ser., vol. 48, pp. 443-449, December, 1919.
1564. Organization meeting of the Mineralogical Society of America: *Am. Mineralogist*, vol. 5, no. 1, pp. 10-11, January, 1920.
1565. Contact-metamorphic deposit at the Mountain Lake mine near Salt Lake City, Utah (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 162, March 31, 1920.

Rogers, G. Sherburne.

1566. The Sunset-Midway oil field, California; Part II, Geochemical relations of the oil, gas, and water: *U. S. Geol. Survey, Prof. Paper* 117, 103 pp., 2 pls., 8 figs., 1919. Abstract by J. D. Sears, *Washington Acad. Sci., Jour.*, vol. 10, no. 18, p. 523, November 4, 1920.
1567. Petroleum hydrology applied to Mid-Continent field (discussion) [oil-field waters of California and Mid-Continent fields]: *Am. Inst. Min. Eng., Bull.* no. 147, pp. 603-606, March, 1919.
1568. Intrusive origin of the Gulf coast salt domes: *Econ. Geology*, vol. 14, no. 2, pp. 178-180, March-April, 1919.
1569. Origin of the salt domes of the Gulf coast (abstract): *Washington Acad. Sci., Jour.*, vol. 9, no. 10, pp. 291-292, May 19, 1919.
1570. Helium, the new balloon gas: *Nat. Geog. Mag.*, vol. 35, no. 5, pp. 441-456, illus., May, 1919.
1571. Some oil-field waters of the Gulf coast: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 310-331, 2 figs., 1919.
- See also Lucas, no. 1100.

Rogers, W. R.

1572. Statistical review of the mining industry of Ontario for 1919: *Ontario Dept. Mines, 29th Ann. Rept.*, 1920, pt. 1, pp. 1-60, 1919.

Romberg, Arnold.

1573. A practical long-period seismograph: *Science*, new ser., vol. 50, pp. 141-142, 1 fig., August 8, 1919.
1574. Theory of a nontilt seismograph: *Seismol. Soc. America, Bull.*, vol. 9, no. 4, pp. 135-139, 2 figs., December, 1919.

Rose, Bruce.

1575. Northern part of Crowsnest coal field, Alberta: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. C, pp. 13-16, 1919.
1576. Highwood coal area, Alberta: *Canada, Geol. Survey, Summ. Rept.* 1919, pt. C, pp. 14-20, 1 fig., 1920.

Ross, Clarence S.

1577. The chloritic material in the ores of southeastern Missouri (abstract): *Illino's Acad. Sci., Trans.*, vol. 9, p. 209 [1917].
1578. Structure and oil and gas resources of the Osage Reservation, Oklahoma, Tps. 21 and 22 N., R. 11 E.: *U. S. Geol. Survey, Bull.* 686, pp. 179-191, 3 pls. (incl. maps), 1 fig., 1919.
(with Bowen, C. F., and others). Structure and oil and gas resources of the Osage Reservation, Oklahoma; Tps. 21-23 N., Rs. 6-7 E., and Tps. 23-25 N., Rs. 3-5 E.: *U. S. Geol. Survey, Bull.* 686, pp. 279-301, 3 pls. (incl. maps), 1919.
(with Larsen, Esper S.). The R and S molybdenum mine, Taos County, New Mexico: *Econ. Geology*, vol. 15, no. 7, pp. 567-573, November, 1920.

Ross, Clyde P.

1579. Geology of the lower Gila region, Arizona (abstract): Washington Acad. Sci., Jour., vol. 10, no. 2, pp. 51-52, January 19, 1920.

Ross, James G.

1580. Occurrences of chrome iron ore: Canadian Min. Inst., Bull., no. 92, pp. 1204-1207, December, 1919; Trans., vol. 22, pp. 130-134 [1920].

Rothpletz, August.

1581. Ueber die systematische Deutung und die stratigraphische Stellung der ältesten Versteinerungen Europas und Nordamerikas mit besonderer Berücksichtigung der Cryptozoen und Oolithe; I. Teil, Die Fauna der Beltformation bei Helena in Montana: Kön. Bayerische Akad. Wiss., mat-phys. Kl., Abh., Bd. 28, 1. Abh., 46 pp., 3 pls., 1915.

1582. Ueber die systematische und die stratigraphische Stellung der ältesten Versteinerungen Europas und Nordamerikas mit besonderer Berücksichtigung der Cryptozoen und Oolithe; II. Teil, Ueber *Cryptozoon*, *Eozoon*, und *Atikokania*: Kön. Bayerische Akad. Wiss., mat-phys. Kl., Abh., Bd. 28, 4. Abh., 92 pp., 8 pls., 8 figs., 1916.

Roundy, P. V.

- (with Bowen, C. F., and others). Structure and oil and gas resources of the Osage Reservation, Oklahoma; Tps. 21-23 N., Rs. 6-7 E., and Tps. 23-25 N., Rs. 3-5 E.: U. S. Geol. Survey Bull. 686, pp. 279-301, 3 pls. (incl. maps), 1919.

Rowe, J. P.

1583. Possibility of oil and gas in Montana: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 313-315, 1920.
1584. Oil and gas in Montana: Eng. and Min. Jour., vol. 110, no. 9, pp. 412-417, 1 fig., August 28, 1920.

Ruedemann, Rudolf.

1585. On some fundamentals of pre-Cambrian paleogeography: Nat. Acad. Sci., Proc., vol. 5, no. 1, pp. 1-6, 1 fig., January 15, 1919.
1586. A recurrent Pittsford (Salina) fauna: New York State Mus. Bull. nos. 219, 220, pp. 205-222, 3 pls., 1920.

Runner, J. J.

1587. The origin of coal: Pahasapa Quart., vol. 8, no. 2, pp. 74-83, February, 1919.
1588. Some problems of Black Hills pre-Cambrian geology: Pahasapa Quart., vol. 10, no. 1, pp. 17-26, December, 1920.

Russell, Philip G.

1589. The coals of Sexton Creek . . . [Clay County, Kentucky]: Kentucky Geol. Survey, Fourth series, vol. 4, pt. 3, pp. 185-260, 1918.
- (with Browning, I. B.). Coals and structure of Magoffin County Kentucky: Kentucky Geol. Survey, Fourth Series, vol. 5, pt. 2, 552 pp., 2 maps, 1919.

Rutledge, J. J.

1590. Peace River oil [Alberta]: Canadian Min. Jour., vol. 40, pp. 401-402, June 4, 1919.

St. Clair, Stuart.

1591. Irvine oil district, Kentucky: Am. Inst. Min. and Met. Eng., Bull. no. 151, pp. 1079-1089, 1 fig., July, 1919; Kentucky, Dept. Geology and Forestry, ser. V [of Ky. Geol. Survey], Mineral and Forest Resources of Kentucky, vol. 1, no. 2, pp. 58-76, 9 figs., July 1, 1919.

1592. Clay deposits near Mountain Glen, Union County, Illinois: Illinois State Geol. Survey, Bull. no. 36, pp. 71-83, 2 figs., 1920.

See also Glenn, no. 663.

Salisbury, Rollin D.

1593. Physiography. 3d ed., revised, 676 pp., 608 figs., New York, Henry Holt and Company, 1919.

1594. (and Alden, William C.). The geography of Chicago and its environs (revised edition): Geog. Soc. Chicago, Bull. no. 1, 63, pp., 29 figs., 2 pls., May, 1920.

(with Weller, Stuart, and others). The geology of Hardin County and the adjoining part of Pope County: Illinois State Geol. Survey, Bull. no. 41, 416 pp., 30 figs., 11 pls., 1920.

Sánchez Roig, Mario.

1595. Una excursión á Viñales [Jurassic fossils]: Revista de Agricultura, Comercio, y Trabajo, año 2, no. 12, pp. 588-591, 9 figs., Habana, December, 1919.

1596. La fauna jurásica de Viñales: Cuba, Secretaría de Agr., Bol. Especial, 61 pp., 23 pls., 1920.

1597. Escualidos del Mioceno y Plioceno de la Habana: Cuba, Dirección Montes y Minas, Boletín de Minas, no. 6, pp. 1-16, 12 pls., 1920.

Sapper, Karl.

1598. Alte und neue Bilder des Masaya und Momotombo [volcanoes, Nicaragua]: Zeitschr. Vulkanologie, Bd. 2, H. 4, pp. 226-231, June, 1916.

1599. Ueber Hornitos und verwandte Gebilde: Zeitschr. Vulkanologie, Bd. 5, H. 1, pp. 1-39, 9 pls., 5 figs., June, 1919.

Sardeson, Frederick W.

1600. Description of the Herman, Barrett, Chokio, and Morris quadrangles, Minnesota: U. S. Geol. Survey, Geol. Atlas, Herman-Morris folio (no. 210), 10 pp., 12 figs., 8 maps, 1919.

(with Leverett, Frank). Surface formations and agricultural conditions of the south half of Minnesota: Minnesota Geol. Survey, Bull. no. 14, 147 pp., 9 pls. (incl. map), 15 figs., 1919. Abstract Washington Acad. Sci., Jour., vol. 10, no. 16, pp. 471-472, October 4, 1920.

Sauer, Carl O.

1601. The geography of the Ozark Highland of Missouri: Geographic Society of Chicago, Bull. no. 7, 245 pp., 44 figs., 26 pls., January, 1920.

Savage, T. E.

1602. The Thebes sandstone and Orchard Creek shale and their faunas in Illinois: Illinois Acad. Sci., Trans., vol. 10, pp. 261-275, 2 pls. [1918].

1603. (and Van Tuyl, Francis M.). Geology and stratigraphy of the area of Paleozoic rocks in the vicinity of Hudson and James bays: Geol. Soc. America, Bull., vol. 30, pp. 339-378, 3 pls., 4 figs. (paleogeographic maps), September 30, 1919.

Savage, T. E.—Continued.

1604. The Devonian formations of Illinois: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 169-182, 3 figs., March, 1920.
1605. The Devonian rocks of southwestern Illinois (abstract): *Science*, new ser., vol. 51, pp. 494-495, May 14, 1920.
(with Tough, Fred B., and Williston, S. H.). Experiments in water control in the Flat Rock pool, Crawford County: *Illinois State Geol. Survey, Bull. no. 40*, pp. 97-140, 3 pls. (maps), 18 figs., 1919.

Sayles, Robert W.

1606. Seasonal deposition in aqueoglacial sediments: *Harvard Coll., Mus. Comp. Zool., Mem.*, vol. 47, no. 1, 67 pp., 16 pls., 2 figs., February, 1919.
1607. Report on the geological collections: *Harvard Coll., Mus. Comp. Zool., Ann. Rept.*, 1919-1920, p. 32, 1920.

Schaller, Waldemar T.

1608. Planchete and shattuckite, copper silicates, are not the same mineral: *Washington Acad. Sci., Jour.*, vol. 9, no. 5, pp. 131-134, March 4, 1919.
1609. Gems and precious stones in 1918: *U. S. Geol. Survey, Mineral Resources*, pt. 2, pp. 7-14, July 16, 1919.
1610. Mica in 1918: *U. S. Geol. Survey, Mineral Resources*, 1918, pt. 2, pp. 629-694, May 24, 1920.
1611. Thorium, zirconium, and rare-earth minerals in 1919: *U. S. Geol. Survey, Mineral Resources*, 1919, pt. 2, pp. 1-32, September 1, 1920.

Scheffel, Earl R.

1612. "Slides" in the Conemaugh formation near Morgantown, West Virginia: *Jour. Geology*, vol. 28, no. 4, pp. 340-355, 5 figs., May-June, 1920.

Schneider, Hyrum.

1613. General geology of Utah: *Utah, Univ., Bull.*, vol. 10, no. 11 (Engineering Station, Department of Metallurgical Research, *Bull. no. 12*), pp. 3-33, December, 1919.

Schoch, E. P.

1614. Chemical analyses of Texas rocks and minerals: *Texas, Univ., Bull.*, no. 1814, 256 pp., March 5, 1918 [1920?].

Schoewe, W. H.

1615. The interpretation of certain leached gravel deposits in Louisa and Washington counties, Iowa: *Iowa Acad. Sci., Proc.*, vol. 26, pp. 393-398 [1920].

Schofield, Stuart J.

1616. Britannia map area [British Columbia]: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. B, pp. 56-59, 1919.
1617. Ainsworth mining district, British Columbia: *Canada, Geol. Survey, Summ. Rept.*, 1918, pt. B, pp. 60-62, 1919.
1618. The Mesozoic period of mineralization in British Columbia: *Canadian Min. Inst., Trans.*, vol. 21, pp. 422-427, 1 pl. (map) [1919].
1619. Geology and ore deposits of Ainsworth mining camp, British Columbia: *Canada, Geol. Survey, Mem.* 117, 73 pp., 3 pls., 6 figs., 12 maps, 1920.

Schofield, Stuart J.—Continued.

1620. The discovery of fossils in the Mesozoic rocks of Hedley, B. C.: Canada, Geol. Survey, Summ. Rept., 1919, pt. B, pp. 38–39, 1920.
 1621. The origin of the Purcell Trench, British Columbia (Kootenay Lake valley): Roy. Soc. Canada, Proc. and Trans., 3d ser., vol. 13, sec. 4, pp. 23–31, 3 figs. (maps), 1920.

Schramm, E. F.

1622. Notes on the oil shales of southwestern Wyoming: Am. Assoc. Petroleum Geologists Bull., vol. 4, no. 2, pp. 195–208, 7 figs., 1920.

Schroeder, Rolf A.

1623. Ball clays of west Tennessee: Tennessee State Geol. Survey, Resources of Tennessee, vol. 2, no. 2, pp. 81–180, 13 figs., April, 1919.
 1624. Curious erosion feature in west Tennessee clays: Jour. Geology, vol. 27, no. 6, pp. 480–481, 1 fig., September–October, 1919.

Schroyer, C. R.

- (with Stauffer, C. R.). The Dunkard series of Ohio: Ohio Geol. Survey, Fourth series, Bull. 22, 167 pp., 14 pls. (incl. map), 1920.

Schuchert, Charles.

1625. The Taconic system resurrected: Am. Jour. Sci., 4th ser., vol. 47, pp. 113–116, February, 1919.
 1626. The proper name for the fossil hydroid *Beatricea*: Am. Jour. Sci., 4th ser., vol. 47, pp. 293–296, 1 fig., April, 1919.
 1627. A Lower Cambrian edrioasterid, *Stomatocystites walcotti*: Smithsonian Misc. Coll., vol. 70, no. 1, 8 pp., 1 pl., 1 fig., 1919.
 1628. The relations of stratigraphy and paleogeography to petroleum geology: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 286–298, 1919.
 1629. Joseph Barrell: Science, new ser., vol. 49, pp. 605–607, June 27, 1919.
 1630. Joseph Barrell: Sci. Monthly, vol. 9, no. 1, pp. 93–96, port., July, 1919.
 1631. Joseph Barrell (1869–1919): Am. Jour. Sci., 4th ser., vol. 48, pp. 251–280, port., October, 1919.
 1632. Petroliferous provinces (discussion of paper of E. G. Woodruff): Am. Inst. Min. and Met. Eng., Bull., no. 155, pp. 3058–3070, November, 1919.
 1633. A paleontologic revival at Yale University: Science, new ser., vol. 51, pp. 80–81, January 23, 1920.
 1634. American paleontologists and the immediate future of paleontology: Geol. Soc. America, Bull., vol. 31, no. 3, pp. 363–373, September 30, 1920.
 1635. The boundary between the Silurian and Devonian in Shropshire and France: Science, new ser., vol. 52, pp. 339–340, October 8, 1920.
 1636. Diagenesis in sedimentation (with discussion): Geol. Soc. America, Bull., vol. 31, no. 4, pp. 425–432, November 30, 1920.
 1637. The nature of Paleozoic crustal instability in eastern North America: Am. Jour. Sci., 4th ser., vol. 50, pp. 399–414, 6 figs, December, 1920.

Schultz, Alfred Reginald.

1638. A geologic reconnaissance for phosphate and coal in southeastern Idaho and western Wyoming (U. S. Geol. Survey, Bull. 680, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 11, p. 319, June 4, 1919.
 1639. Oil possibilities in and around Baxter Basin, in the Rock Springs uplift, Sweetwater County, Wyoming: U. S. Geol. Survey, Bull. 702, 107 pp., 9 figs., 17 pls. (incl. maps), 1920.

Schwennesen, A. T.

1640. Geology and water resources of the Gila and San Carlos valleys in the San Carlos Indian Reservation, Arizona: U. S. Geol. Survey, Water-Supply Paper 450, pp. 1-27, 4 pls. (maps), 2 figs., November 10, 1919.

Scott, David B.

1641. Ore deposits of the Mogollon district [New Mexico]: Mining and Metallurgy, no. 158, sec. 1, p. 33, 1 fig. (abstract), sec 33, 22 pp., 5 figs., February, 1920; (with discussion by H. G. Ferguson), Am. Inst. Min. and Met. Eng., Trans., vol. 63, pp. 289-310, 5 figs., 1920.

Sears, Julian D.

1642. Deposits of manganese ore in Costa Rica: U. S. Geol. Survey, Bull. 710, pp. 61-83, 1 pl. (map), 26 figs., December 30, 1919.

1643. Deposits of manganese ore near Boqueron River, Panama: U. S. Geol. Survey, Bull. 710, pp. 85-91, 3 figs., December 30, 1919. Abstract, Washington Acad. Sci. Jour., vol. 10, no. 20, pp. 573-574, December 4, 1920.

See also Ashley, no. 40; Gill, no. 652; Overbeck, no. 1372.

Sellards, E. H.

1644. Administrative report: Florida State Geol. Survey, Twelfth Ann. Rept., pp. vii-viii, 1919.

1645. Literature relating to human remains and artifacts at Vero, Florida: Am. Jour. Sci., 4th ser., vol. 47, pp. 358-360, May, 1919. Florida State Geol. Survey, Twelfth Ann. Rept., pp. 1-4, 1919.

1646. Geologic sections across the everglades of Florida: Florida State Geol. Survey, Twelfth Ann. Rept., pp. 67-76, 1 fig., 1919.

1647. Review of the geology of Florida, with special reference to structural conditions: Florida State Geol. Survey, Twelfth Ann., Rept., pp. 105-141, 2 pls. (maps), 1 fig., 1919.

1648. Geology of Florida: Jour. Geology, vol. 27, no. 4, pp. 286-302, 1 pl. (map), 2 figs., May-June, 1919.

1649. Comanchean formations underlying Florida: Am. Jour. Sci., 4th ser., vol. 48, pp. 13-16, 1 fig., July, 1919.

1650. Structural conditions in the oil fields of Bexar County, Texas: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 299-309, 1919.

1651. Some characteristics of the Balcones fault zone (abstract): Science, new ser., vol. 51, p. 519, May 21, 1920.

1652. The underground position of the Ellenburger formation in north central Texas: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 283-298, map, 1920.

1653. The geology and mineral resources of Bexar County: Texas, Univ., Bull., no. 1932, 202 pp., 1 pl., 6 figs., map, March, 1920.

1654. On the underground position of the Ellenburger formation in north central Texas; with a preliminary contour map: Texas, Univ., Bull. no. 1849, 32 pp., map, July, 1920.

Semmes, Douglas R.

1655. The geology of the San Juan district, Porto Rico: New York Acad. Sci., Scientific Survey of Porto Rico and the Virgin Islands, vol. 1, pt. 1, pp. 33-110, 4 pls., map, 26 figs., 1919.

1656. Petroleum possibilities of Alabama; Part I, Northern Alabama: Alabama, Geol. Survey, Bull., no. 22, p. 9-120, 1 pl., 20 figs., 1920.

Semmes, Douglas R.—Continued.

1657. Oil possibilities in northern Alabama: Mining and Metallurgy, no. 159, sec. 1, p. 51 (abstract), sec. 5, 10 pp., 1 fig. (map), March, 1920; discussion by David White and Mowry Bates [Am. Inst. Min. and Metal. Eng., Trans., preprint] no. 1038, p. 60, January, 1921.
1658. Notes on the Tertiary intrusives of the lower Pecos Valley, New Mexico: Am. Jour. Sci., 4th ser., vol. 50, pp. 415-430, 7 figs., December, 1920.

Shannon, C. W.

1659. (and Rockwell, F. C.). New oil and gas development in Oklahoma: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 3, pp. 277-281, 1920.

Shannon, Earl V.

1660. Famous mineral localities; the datolite locality near Westfield, Massachusetts: Am. Mineralogist, vol. 4, no. 1, pp. 5-6, January, 1919.
1661. Anglesite from the Coeur d'Alene district, Idaho: Am. Jour. Sci., 4th ser., vol. 47, pp. 287-292, 7 figs., April, 1919.
1662. Famous mineral localities; the Pelham asbestos mine, Massachusetts: Am. Mineralogist, vol. 4, no. 4, pp. 37-39, April, 1919.
1663. Famous mineral localities; the Chester emery mine [Massachusetts]: Am. Mineralogist, vol. 4, no. 6, pp. 69-72, June, 1919.
1664. Linarite and leadhillite from Idaho: Am. Mineralogist, vol. 4, no. 8, pp. 93-94, August, 1919.
1665. On coarse gabbroid diabase in Westfield, Massachusetts: Jour. Geology, vol. 27, no. 7, pp. 579-581, October-November, 1919.
1666. The trap quarry at Meriden, Connecticut: Am. Mineralogist, vol. 5, no. 2, p. 34, February, 1920.
1667. A new description of amesite: Am. Jour. Sci., 4th ser., vol. 49, pp. 96-98, February, 1920.
1668. The occurrence of bindheimite as an ore mineral: Econ. Geology, vol. 15, no. 1, pp. 88-93, January-February, 1920.
1669. Bismutoplagonite, a new mineral: Am. Jour. Sci., 4th ser., vol. 49, pp. 166-168, March, 1920.
1670. Strickland's quarry, Portland, Connecticut: Am. Mineralogist, vol. 5, no. 3, pp. 51-54, March, 1920.
1671. The old lithia mine in Chatham, Connecticut: Am. Mineralogist, vol. 5, no. 4, pp. 82-84, April, 1920.
1672. Diabantite, stilpnomelane, and chalcodite of the trap quarries of Westfield, Massachusetts: U. S. Nat. Mus., Proc., vol. 57, pp. 397-403, 1920.
1673. Petrography of some lamprophyric dike rocks of the Coeur d'Alene mining district, Idaho: U. S. Nat. Mus., Proc., vol. 57, pp. 475-495, 3 pls., 4 figs., 1920.
1674. Recent accessions in the division of applied geology: U. S. Nat. Mus., Proc., vol. 58, pp. 323-326, 1920.
1675. Analyses and optical properties of amesite and corundophilite from Chester, Massachusetts, and of chromium-bearing chlorites from California and Wyoming: U. S. Nat. Mus., Proc., vol. 58, pp. 371-379, 1920.
1676. Notes on anglesite, anthophyllite, calcite, datolite, sillimanite, stilpnomelane, tetrahedrite, and triplite: U. S. Nat. Mus., Proc., vol. 58, pp. 437-453, 13 figs., 1920.

Shannon, Earl V.—Continued.

- 1677. Some minerals from the old tungsten mine at Long Hill in Trumbull, Connecticut: U. S. Nat. Mus., Proc., vol. 58, pp. 469-482, 1 fig., 1920.
- 1678. Boulangerite, bismutoplacionite, naumannite, and a silver-bearing variety of jamesonite: U. S. Nat. Mus., Proc., vol. 58, pp. 589-607, 1920.
- 1679. An occurrence of naumannite in Idaho: Am. Jour. Sci., 4th ser., vol. 50, pp. 390-391, November, 1920.
(with Larsen, Esper S.). Boussingaultite from South Mountain, near Santa Paula, California: Am. Mineralogist, vol. 5, no. 7, pp. 127-129, July, 1920.
(with Palache, Charles). Higginsite, a new mineral of the olivenite group [Bisbee, Arizona]: Am. Mineralogist, vol. 5, no. 9, pp. 155-157, 2 figs., September, 1920.

Shaw, Eugene Wesley.

- 1680. (and Mather, Kirtley F.). The oil fields of Allen County, Kentucky, with notes on the oil geology of adjoining counties: U. S. Geol. Survey, Bull. 688, 126 pp., 10 pls. (incl. maps), 10 figs., 1919. Abstract by R. W. Stone, Washington Acad. Sci., Jour., vol. 9, no. 15, p. 439, September 19, 1919.
- 1681. An interpretation of the so-called paraffin dirt of the Gulf Coast oil fields (discussion): Am. Inst. Min. Eng., Bull. no. 145, pp. 98-101, January, 1919.
- 1682. Mexican petroleum and the war (abstract): Geol. Soc. America, Bull., vol. 30, pp. 109-110, March 31, 1919.
- 1683. Stratigraphy of the Gulf Coastal Plain as related to salt domes (abstract): Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 289-291, May 19, 1919.
- 1684. Present tendencies in geology; sedimentation: Washington Acad. Sci., Jour., vol. 9, no. 17, pp. 513-521, October 19, 1919.
- 1685. (and Ports, P. L.). Natural gas resources available to Dallas and other cities of central north Texas: U. S. Geol. Survey, Bull. 716, pp. 55-89, 2 pls. (maps), 10 figs., 1920.
- 1686. Physical and geographic criteria in the study of sedimentary deposits: Geol. Soc. America, Bull., vol. 31, no. 4, pp. 411-418, November 30, 1920.

See also Brokaw, no. 201; Johnson, no. 939; Louderback, no. 1084; Willis, no. 2047.

Shedd, Solon.

- 1687. Mineral resources of Washington. In Northwest Mines Handbook, vol. 1, pp. 146-149, published by Sidney Norman, Spokane, Washington, 1918.

Shepherd, E. S.

- 1688. The composition of the gases of Kilauea: Hawaiian Volcano Observatory, Bull., vol. 7, no. 7, pp. 94-97, July, 1919. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 1, pp. 23-24, January 4, 1920.
- 1689. Two gas collections from Mauna Loa: Hawaiian Volcano Observatory, Monthly Bull., vol. 8, no. 5, pp. 65-67, May, 1920.

Shiltz, John H.

- 1690. Soil survey of Whitley County: Indiana, Dept. Geology and Nat. Res., 41st Ann. Rep., pp. 67-78, 1917.

Shimek, B.

1691. Further notes on *Helicina occulta* Say: Iowa Acad. Sci., Proc., vol. 26, pp. 385-390 [1920].

Shimer, Hervey Woodburn.

1692. Samuel Wendell Williston (1852-1918): Am. Acad. Arts, Proc., vol. 54, no. 6, pp. 421-423, September, 1919.
1693. Permo-Triassic of northwestern Arizona: Geol. Soc. America, Bull., vol. 30, no. 4, pp. 471-497, 1 fig., December 31, 1919; abstract, no. 1, p. 155, March 31, 1919.

Shipley, J. W.

1694. The Valley of Ten Thousand Smokes: Science, new ser., vol. 49, pp. 589-591, June 20, 1919.
1695. Some chemical observations on the volcanic emanations and incrustations in the Valley of Ten Thousand Smokes, Katmai, Alaska: Am. Jour. Sci., 4th ser., vol. 50, pp. 141-153, 1 fig., August, 1920.

Shuler, Ellis W.

1696. The geology of Dallas County: Texas, Univ., Bull. no. 1818, 54 pp., 21 pls. (incl. map), March 25, 1918.

Siebenthal, C. E.

1697. Cadmium in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 1-12, May 8, 1919.
1698. Zinc and cadmium in 1916; U. S. Geol. Survey, Mineral Resources, 1916, pt. 1, pp. 809-835, 1 pl., June 9, 1919.
1699. Lead in 1916: U. S. Geol. Survey, Mineral Resources, 1916, pt. 1, pp. 837-854, 1 pl., June 10, 1919.
1700. Zinc in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 855-879, April 6, 1920.
1701. Lead in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 881-897, 1 pl., 1920.
1702. Cadmium in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 1, pp. 1-8, June 18, 1920.

Sievers, E. G.

1703. Natural gas and natural-gas gasoline in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 1393-1437, 12 figs., 1920.

Simmersbach, B.

1704. Die bergbauliche Entwicklung Kanadas mit besonderer Berücksichtigung der Nickelgewinnung: Zeitschr. prakt. Geologie, Jg. 25, H. 7, pp. 111-116, July, 1917.
1705. Prehnit vom Adams Sund, Admiralty Inlet, Baffinsinsel, Franklin: Zeitschr. prakt. Geologie, Jg. 25, H. 8, pp. 139-141, August, 1917.

Simpson, Louis.

1706. Oil-yielding shales in the province of New Brunswick: Canadian Min. Inst., Monthly Bull., no. 1, pp. 42-47, January, 1919.

Sinclair, William J.

1707. New mounts in the Princeton geological museum (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 223, March 31, 1920.

Singewald, Joseph T., jr.

1708. Sand chrome deposits of Maryland (abstract): Geol. Soc. America, Bull., vol. 30, p. 111, March 31, 1919.
1709. Maryland sand chrome ore: Econ. Geology, vol. 14, no. 3, pp. 189-197, 5 figs., May, 1919.

Sizer, Frank L.

1710. The Divide district [Tonopah, Nevada]: Min. and Sci. Press, vol. 118, pp. 631-633, 4 figs., May 10, 1919.

Skeels, Frank H.

1711. A preliminary report on the clays of Idaho: Idaho, Bur. Mines and Geology, Bull. no. 2, 74 pp., 9 figs., 1920.

Slipper, S. E.

1712. Sketch of the geology of southern and central Alberta: Canada, Geol. Survey, Mem. 116, pp. 11-24, 1919.

(with Dowling, D. B., and McLearn, F. H.). Investigation in the gas and oil fields of Alberta, Saskatchewan, and Manitoba: Canada, Geol. Survey, Mem. 116, 89 pp., 14 pls. (incl. maps), 1919.

Smith, Eugene Allen.

1713. A geological map of Alabama: Alabama, Geol. Survey, Bull. 22, frontispiece, 1920.

Smith, George L.

1714. Contributions to the geology of southwestern Iowa: Iowa Acad. Sci., Proc., 1918, vol. 25, pp. 521-537, 1 fig. [1919].

Smith, George Otis.

1715. Fortieth annual report of the Director of the United States Geological Survey to the Secretary of the Interior for the fiscal year ended June 30, 1919. 200 pp., 2 pls. (maps), 1 fig., Washington, 1919.

1716. (Editor). The strategy of minerals . . . 372 pp., 17 figs., New York, D. Appleton & Company, 1919.

1717. Economic limits to domestic independence in minerals (abstract, with discussion by G. F. Loughlin and F. E. Wright): Geol. Soc. America, Bull., vol. 30, pp. 98-99, March 31, 1919.

1718. Military contribution of civilian engineers: Geol. Soc. America, Bull., vol. 30, no. 3, pp. 399-404, September 30, 1919; abstract, no. 1, p. 79, March 31, 1919.

1719. Geological Survey reports: Eng. and Min. Jour., vol. 108, p. 740, November 1, 1919.

1720. Forty-first annual report of the Director of the United States Geological Survey to the Secretary of the Interior for the fiscal year ended June 30, 1920. 180 pp., 3 pls. (maps), Washington, 1920.

1721. The public service opportunity of the oil geologist: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 5-15, 1920.

1722. Our industry's part: Am. Mining Congress, Rept. of the Proceedings of the Twenty-Second Annual Convention [vol. 23], pp. 317-325 [1920].

Smith, Isabel F.

1723. A columbite crystal from Boothwyn, Pennsylvania: Am. Mineralogist, vol. 4, no. 10, pp. 121-123, 1 pl., October, 1919.

Smith, James Perrin.

1724. Climatic relations of the Tertiary and Quaternary faunas of the California region: California Acad. Sci., Proc., 4th ser., vol. 9, no. 4, pp. 123-173, 1 pl., July 12, 1919.

Smith, John E.

1725. Deposits of volcanic ash (abstract): Elisha Mitchell Sci. Soc., Jour., vol. 35, no. 1-2, pp. 7-8, October, 1919.

1726. Agricultural geology: Science, new ser., vol. 52, pp. 139-142, August 13, 1920.

Smith, Philip S.

1727. Sulphur and pyrites in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 357-377, 3 figs., December 11, 1919.

Smith, Warren Dupre.

1728. (and Packard, Earl L.). The salient features of the geology of Oregon: Jour. Geology, vol. 27, no. 2, pp. 79-120, 3 figs., 1 pl., 1919. Oregon, Univ., Bull., vol. 16, no. 7, pp. 79-120, 3 figs., 1 pl., July, 1919.

1729. Rock classification for engineering: Econ. Geology, vol. 14, no. 2, pp. 180-183, March-April, 1919.

1730. Geology as a synthetic science (abstract): Geol. Soc. America, Bull., vol. 30, pp. 77-78, March 31, 1919.

1731. War work by the department of geology at the University of Oregon (abstract): Geol. Soc. America, Bull., vol. 30, p. 83, March 31, 1919.

1732. Earthquakes in Oregon: Seismol. Soc. America, Bull., vol. 9, no. 3, pp. 59-71, 2 figs., September, 1919. Also issued as Oregon, Univ., Pub., vol. 1, no. 3, February, 1920.

Smithsonian Institution.

1733. Explorations and field work of the Smithsonian Institution in 1918: Smithsonian Misc. Coll., vol. 70, no. 2, 122 pp. [geological and paleontological, pp. 3-27], 127 figs., 1919.

1734. Explorations and field work of the Smithsonian Institution in 1919: Smithsonian Misc. Coll., vol. 72, no. 1, 80 pp., 77 figs., 1920.

Smyth, C. H., jr.

1735. On the genetic significance of ferrous silicate associated with the Clinton iron ores: New York State Mus. Bull., nos. 207-209, pp. 175-198, 6 pls., 1919.

Snider, L. C.

1736. Oil and gas in the Mid-Continent fields. 393 pp., 97 figs. (incl. maps), Oklahoma City, Okla., Harlow Publishing Co., 1920.

Snyder, J. P.

(with Johnson, J. H.). The caves of the Black Hills: Pahasapa Quart., vol. 9, no. 4, pp. 175-187, 9 figs. June, 1920.

Somers, R. E.

1737. Microscopic examination of clays: Washington Acad. Sci., Jour., vol. 9, no. 4, pp. 113-126, March 4, 1919.

(with Ries, H.). The clays and shales of Virginia west of the Blue Ridge: Virginia Geol. Survey, Bull. no. 20, 118 pp., 8 figs. (incl. map), 1920.

Sommermeier, L.

1738. Ueber einen Fossilfund aus der Unteren Kreide von Trinidad [*Didymotis trinidadensis*, Lower Cretaceous]: Centralbl. Mineralogie, 1918, no. 7-8, pp. 131-136, 2 figs., April, 1918.

Soper, Edgar K.

1739. The peat deposits of Minnesota: Minnesota Geol. Survey, Bull. no. 16, 261 pp., 21 pls. (incl. maps), 10 figs., 1919.
 (with Grout, Frank F.). Geology of Minnesota: U. S. Geol. Survey, Bull. 678, pp. 70-105, 2 pls. (incl. map), 3 figs., 1919.
 (with Varley, Thomas, and others). A preliminary report on the mining districts of Idaho: U. S. Bur. Mines, Bull. 166, pp. 1-89, 2 pls. (maps), 1919.

Sosman, Robert B.

1740. The temperature inversions in the fumaroles of the Valley of Ten Thousand Smokes, Alaska Peninsula (abstract): Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 292-293, May 19, 1919.
 1741. Note on volcanic explosions (abstract): Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 296-297, May 19, 1919.
 1742. An outline of geophysical-chemical problems: Nat. Acad. Sci., Proc., vol. 6, no. 10, pp. 592-601, October 15, 1920. Nat. Research Council, Reprint and Circular ser., no. 11, pp. 592-601, 1920.

Spearman, Charles.

1743. The graphite industry: Canadian Min. Jour., vol. 40, pp. 87-88, February 12, 1919.

Spence, Hugh S.

1744. Graphite: Canada, Dept. Mines, Mines Branch, 202 pp., 56 pls., 43 figs., 6 maps, 1920.
 1745. Phosphate in Canada: Canada, Mines Branch, 156 pp., 12 figs., 32 pls., maps, 1920.

Spencer, L. J.

1746. Mineralogical characters of turite (=turgite) and some other iron ores from Nova Scotia: Mineralogical Mag., vol. 18, pp. 339-348, 4 figs., May, 1919.

Springer, Frank.

1747. New species of crinoid [*Eucheirocrinus ontario*]: Canada, Geol. Survey, Mem. 111, p. 127, 1 fig., 1919.
 1748. The Crinoidea Flexibilia. 486 pp., 51 figs., and atlas of 79 pls., The Smithsonian Institution, 1920.

Spurr, J. E.

1749. Commercial control of the mineral resources of the world (abstract): Geol. Soc. America, Bull., vol. 30, pp. 108-109, March 31, 1919.
 1750. (Editor). Political and commercial geology and the world's mineral resources. 562 pp., 23 figs. New York, McGraw-Hill Book Company, 1920.
 1751. The copper ores of Lake Superior: Eng. and Min. Jour., vol. 110, no. 8, pp. 355-357, 1 fig., August 21, 1920.

Stansfield, J.

1752. Surface deposits of southeastern Saskatchewan: Canada, Geol. Survey, Summ. Rept., 1918, pt. C, pp. 42-48, 1919.
 1753. Hornblendite at Vavasour mine, Cantley, Quebec: Geol. Mag., vol. 57, p. 307, July, 1920.

Stanton, Timothy W.

1754. Mesozoic history of Mexico, Central America, and the West Indies: Geol. Soc. America, Bull., vol. 29, no. 4, pp. 601-606, December 30, 1918.

Stanton, Timothy W.—Continued.

1755. [Correlation of western Upper Cretaceous formations]: U. S. Geol. Survey, Prof. Paper 120, pp. 165–167, 1919.

1756. The fauna of the Cannonball marine member of the Lance formation: U. S. Geol. Survey, Prof. Paper 128, pp. 1–60, 9 pls., 3 figs, August 11, 1920.

Stauffer, C. R.

1757. (and Schroyer, C. R.). The Dunkard series of Ohio: Ohio Geol. Survey, Fourth series, Bull. 22, 167 pp., 14 pls. (incl. map), 1920.

Stebinger, Eugene.

1758. Oil and gas geology of the Birch Creek-Sun River area, northwestern Montana (U. S. Geol. Survey, Bull. 691, pp. 149–184, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 15, pp. 443–444, September 19, 1919.

Steidtmann, Edward.

1759. Feldspars as indicators of sedimentary or igneous origin of gneisses and schists: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 141–144, March 31, 1920.

1760. Summaries of pre-Cambrian literature of North America: Jour. Geology, vol. 28, no. 6, pp. 558–568, no. 7, pp. 643–658, no. 8, pp. 743–751, 1920.

Stephenson, E. A.

(with Johannsen, Albert). On the accuracy of the Rosiwal method for the determination of the minerals in a rock: Jour. Geology, vol. 27, no. 3, pp. 212–220, April-May, 1919.

Stephenson, Lloyd William.

1761. A contribution to the geology of northeastern Texas and southern Oklahoma (U. S. Geol. Survey, Prof. Paper 120, pp. 129–163, 1918) (abstract by R. W. Stone): Washington Acad. Sci., Jour., vol. 9, no. 17, pp. 531–532, October 19, 1919.

Sterki, V.

1762. Marl deposits in Ohio and their fossil mollusca: Ohio Jour. Sci., vol. 20, no. 6, pp. 173–184, April, 1920.

Sterns, F. H.

1763. The Pleistocene man of Vero, Florida: Sci. Am. Suppl., vol. 87, pp. 118–119, February 22, 1919.

Stevenson, John J.

1764. Interrelation of the fossil fuels, IV: Am. Philos. Soc., Proc., vol. 59, no. 6, pp. 405–511, 1920.

Stewart, Beatrice Helen.

1765. The stratigraphy and paleontology of Toronto and vicinity; Part I, The Pelecypoda: Ontario Dept. Mines, 29th Ann. Rept., vol. 29, pt. 6, 58 pp., 5 pls., 1920.

Stewart, J. S.

1766. Geology of the disturbed belt of southwestern Alberta: Canada, Geol. Survey, Mem. 112, 71 pp., 5 pls., map, 1919.

1767. Oil and gas possibilities in northeastern British Columbia: Canada, Geol. Survey, Summ. Rept., 1919, pt. C, pp. 3–7, 1 fig., 1920.

Stock, Chester.

- 1768. Cenozoic history of the ground sloth group (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 194, 322, March 31, 1920.
- 1769. Minutes of the ninth annual meeting of the Pacific coast section of the Paleontological Society: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 231-232, March 31, 1920.
- 1770. An early Tertiary vertebrate fauna from the southern coast ranges of California: California, Univ., Dept. Geology, Bull., vol. 12, no. 4, pp. 267-276, 6 figs., April 8, 1920.
- 1771. Origin of the supposed human footprints of Carson City, Nevada: Science, new ser., vol. 51, p. 514, May 21, 1920.
- 1772. A mounted skeleton of *Myiodon harlani*: California Univ., Pub., Dept. Geology, Bull., vol. 12, no. 6, pp. 425-430, 1 pl. November 22, 1920.

Stoller, James H.

- 1773. Topographic features of the Hudson valley and the question of post-glacial marine waters in the Hudson-Champplain valley: Geol. Soc. America, Bull., vol. 30, pp. 415-422, 2 figs., September 30, 1919; abstract, with discussion by H. L. Fairchild, pp. 90-91, March 31, 1919.
- 1774. Glacial geology of the Cohoes quadrangle: New York State Mus. Bull. nos. 215, 216, 49 pp., 11 figs., 2 pls., map, 1920.

Stone, Ralph W.

- 1775. Phosphate rock an economic army (abstract): Geol. Soc. America, Bull., vol. 30, p. 104, March 31, 1919.
- 1776. Magnesite industry (abstract): Geol. Soc. America, Bull., vol. 30, p. 115, March 31, 1919.
- 1777. Sand and gravel in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 381-396, February 21, 1919.
- 1778. Magnesium in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 13-21, July 28, 1919.
- 1779. Salt, bromine, and calcium chloride in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 117-134, August 16, 1919.
- 1780. Phosphate rock in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 199-222, October 4, 1919.
- 1781. Sand and gravel in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 299-315, October 31, 1919.
- 1782. Gypsum in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 282-298, November 6, 1919.
- 1783. Magnesium in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 1, pp. 29-32, August 11, 1920.
- 1784. Gypsum in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 2, pp. 99-113, December 28, 1920.
- 1785. (and others). Gypsum deposits of the United States: U. S. Geol. Survey, Bull. 697, 326 pp., 37 pls., 57 figs., 1920. Includes contributions by George Steiger, E. F. Burchard, H. D. Miser, F. L. Hess, R. D. George, G. F. Kay, Erasmus Haworth, R. A. Smith, J. C. Jones, N. H. Darton, D. H. Newland and Henry Leighton, J. A. Bownocker, L. C. Snider, J. G. Hutton, W. E. Wrather, C. L. Baker, B. F. Hill, C. T. Lupton, and G. W. Stose.] (with Yale, C. G.). Magnesite in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 141-158, September 16, 1919.

Stone, Ralph W.—Continued.

See also Atwood, no. 47; Bastin, no. 93; Berry, nos. 129, 136; Bowen, no. 173; Capps, no. 291; Chapin, nos. 328, 329; Clark, no. 343; Cockerell, no. 366; Collier, nos. 384, 385; Condit, nos. 394, 395; Cushman, no. 430; Eakin, no. 530; Grout, no. 713; Hancock, no. 742; Harrington, no. 760; Jones, nos. 903, 906; Kew, no. 938; Loughlin, no. 1087; Maddren, nos. 1156, 1157; Martin, no. 1176; Miser, no. 1274; Moffit, no. 1285; Overbeck, nos. 1370, 1371; Pardee, no. 1398; Phalen, no. 1428; Schultz, no. 1597; Shaw, no. 1639; Stebinger, no. 1717; Stephenson, no. 1720.

Stose, George W.

- 1786. (and others). Manganese deposits of the west foot of the Blue Ridge, Virginia: Virginia Geol. Survey, Bull. no. 17, 166 pp., 22 pls. (incl. maps), 16 figs., 1919.
 - 1787. Glauberite crystal cavities in the Triassic rocks in the vicinity of Gettysburg, Pa.: Am. Mineralogist, vol. 4, no. 1, pp. 1-4, 1 fig., 1 pl., January, 1919.
 - 1788. Travertine from Rock Creek Park, District of Columbia (abstract, with discussion by R. S. Bassler): Washington Acad. Sci., Jour., vol. 9, no. 10, p. 292, May 19, 1919.
 - 1789. Manganese deposits of the Appalachian Valley of Virginia and Tennessee (abstract): Washington Acad. Sci., Jour., vol. 9, no. 13, pp. 382-384, July 19, 1919.
 - 1790. Strontium in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 541-544, March 30, 1920.
 - 1791. Barytes and barium products in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 951-967, June 28, 1920.
 - 1792. Manganese ores of the Southern States: Eng. and Min. Jour., vol. 110, no. 6, pp. 256-262, 7 figs., August 7, 1920.
 - 1793. Strontium in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 2, pp. 95-98, December 9, 1920.
- See also Mansfield, no. 1171.

Stout, Wilber.

- 1794. Geology of Muskingum County: Ohio, Geol. Survey, Fourth series, Bull. 21, 351 pp., 13 pls. (incl. maps), 1 fig., Columbus, 1918.
- 1795. Coals of Ohio and their limitations for by-product coke: Coal Age, vol. 16, pp. 674-677, 707-711, 1 fig., October 23 and 30, 1919.

Strachan, Robert.

- 1796. The Crowsnest Pass coal field [British Columbia]: Canadian Inst. Min. and Metal., Monthly Bull. no. 102, pp. 766-778, October, 1920.

Suárez Murias, E. R.

- 1797. Visita de inspección á la Isla de Pinos, Cuba, Dirección Montes y Minas, Boletín de Minas, no. 6, pp. 24-28, 1 fig., 1920.
- 1798. Reconocimiento de la zona minera comprendida entre Bahía Honda y La Palma, provincia de Pinar del Río: Cuba, Dirección Montes y Minas, Boletín de Minas, no. 6, pp. 29-32, 1 fig., 1920.
- 1799. Visita de inspección á las minas de cromo de San Miguel de los Baños: Cuba, Dirección Montes y Minas, Boletín de Minas, no. 6, pp. 39-40, 1920.

Sulzer, Elmer G.

1800. Erosional freaks of the Saluda limestone: *Indiana Acad. Sci., Proc.* 1918, p. 309, 1919.

1801. Remnant monument near Madison: *Indiana Acad. Sci., Proc.* 1918, pp. 310-311, 3 figs., 1919.

Swartley, A. M.

1802. Mineral resources of Oregon: *Northwest Mines Handbook*, vol. 1, pp. 294-299, Spokane, Washington, Sidney Norman, 1918.

Swartz, Charles K.

1803. (and Bassler, Harvey). Typical section of the Allegheny formation (abstract): *Geol. Soc. America, Bull.*, vol. 30, no. 1, pp. 153-154, March 31, 1919.

1804. (and Price, W. Armstrong, and Bassler, Harvey). Coal measures of Maryland: *Geol. Soc. America, Bull.*, vol. 30, no. 4, pp. 567-596, 2 pls., 1 fig., December 31, 1919; abstract, no. 1, p. 154, March 31, 1919.

Taber, Stephen.

1805. The mechanics of vein formation (with discussion): *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 3-41, 5 figs., 1920.

1806. Jamaica earthquakes and the Bartlett trough: *Seismol. Soc. America, Bull.*, vol. 10, no. 2, pp. 55-89, 1 pl., June, 1920.

1807. The Inglewood earthquake in southern California, June 21, 1920: *Seismol. Soc. America, Bull.*, vol. 10, no. 3, pp. 129-145, 1 fig., 7 pls., September, 1920.

1808. The earthquake problem in southern California: *Seismol. Soc. America, Bull.*, vol. 10, no. 4, pp. 276-289, December, 1920.

(with Reid, Harry Fielding). The Porto Rico earthquake of 1918, with descriptions of earlier earthquakes: *U. S., 66th Cong., 1st sess., H. R. Doc. no. 269*, 74 pp., 8 pls., 1919.

(with Reid, Harry Fielding). Recent earthquakes of Porto Rico (abstract): *Geol. Soc. America, Bull.*, vol. 30, pp. 83-84, March 31, 1919.

(with Reid, Harry Fielding). The Porto Rico earthquakes of October-November, 1918: *Seismol. Soc. America, Bull.*, vol. 9, no. 4, pp. 95-127, 8 pls., December, 1919.

(with Reid, Harry Fielding). The Virgin Islands earthquakes of 1867-1868: *Seismol. Soc. America, Bull.*, vol. 10, no. 1, pp. 9-30, 3 figs., March, 1920.

Taff, J. A.

1809. Proceedings of the fifteenth summer meeting, held in conjunction with the sixteenth annual meeting of the Cordilleran section, University of California and Stanford University, August 3, 4, and 5, 1915: *Geol. Soc. America, Bull.*, vol. 31, pp. 177-184, March 31, 1920.

1810. Proceedings of the seventeenth annual meeting of the Cordilleran section, held at San Diego, California, August 10, 1916: *Geol. Soc. America, Bull.*, vol. 31, pp. 185-186, March 31, 1920.

1811. Proceedings of the eighteenth annual meeting of the Cordilleran section, held at Stanford University, California, April 6 and 7, 1917: *Geol. Soc. America, Bull.*, vol. 31, pp. 187-190, March 31, 1920.

Talbot, H. W.

1812. The origin of peat: Pahasapa Quart., vol. 8, no. 2, pp. 69-72, February, 1919.

Tanton, T. L.

1813. The Harricanaw-Turgeon basin, northern Quebec: Canada, Geol. Survey, Mem. 109, 84 pp., 9 pls. (incl. map), 2 figs., 1919.
1814. The Canadian National railways between Longuelac and Oba, northern Ontario: Canada, Geol. Survey, Summ. Rept., 1918, pt. E, pp. 1-3, 1919.
1815. Shore of Lake Superior between Port Arthur and Nipigon: Canada, Geol. Survey, Summ. Rept., 1919, pt. E, pp. 1-7, map, 1920.
1816. Silver Islet and vicinity, Thunder Bay district, Ontario: Canadian Min. Inst., Monthly Bull. no. 97, pp. 415-430, 5 figs., May, 1920.

Tarr, W. A.

1817. The barite deposits of Missouri: Econ. Geology, vol. 14, no. 1, pp. 46-67, 2 figs., January-February, 1919.
1818. Contribution to the origin of dolomite (abstract): Geol. Soc. America, Bull., vol. 30, p. 114, March 31, 1919.
1819. The origin of glauconite (abstract): Science, new ser., vol. 51, pp. 491-492, May 14, 1920.
1820. The possibility of a relationship between crystal types and the mode of occurrence of minerals (abstract): Science, new ser., vol. 51, p. 519, May 21, 1920.
1821. Notes on concretions (abstract): Science, new ser., vol. 51, p. 520, May 21, 1920.
1822. A possible factor in the origin of dolomite (abstract): Science, new ser., vol. 51, p. 521, May 21, 1920.

Taylor, Frank B.

1823. One-man surveys for the oil geologist: Colorado School of Mines Mag., vol. 9, no. 10, pp. 269-272, 1 pl., October, 1919.

Teas, L. P.

- (with Hull, J. P. D.). A preliminary report on the oil prospect near Scotland, Telfair County, Georgia: Georgia Geol. Survey, 23 pp., 4 figs., map, 1919.

Thiel, George A.

1824. Gas an important factor in oil accumulation: Eng. and Min. Jour., vol. 109, pp. 888-889, 3 figs., April 10, 1920.

Thiessen, Reinhardt.

1825. Occurrence and origin of finely disseminated sulphur compounds in coal: Am. Inst. Min. and Met. Eng., Bull. no. 153, pp. 2431-2444, 10 figs., September, 1919; Trans., vol. 63, pp. 913-931, 70 figs., 1920; Discussion, Mining and Metallurgy, no. 157, sec. 12, pp. 40-44, January, 1920.
1826. Occurrence and origin of finely disseminated sulphur compounds in coal: Coal Age, vol. 16, pp. 668-673, 10 figs., October 23, 1919.
1827. Under the microscope coal has already lost much of its former mystery: Coal Age, vol. 18, nos. 24-26, pp. 1183-1189, 1223-1226, 1275-1279, 30 figs., December 9, 16, and 23, 1920; vol. 19, no. 1, pp. 12-15, 5 figs., January 6, 1921.

Thiessen, Reinhardt—Continued.

1828. Structure in Paleozoic bituminous coals: U. S. Bur. Mines, Bull. 117, 296 pp., 160 pls., 1920.
 1829. Compilation and composition of bituminous coals: Jour. Geology, vol. 28, no. 3, pp. 185-209, 9 pls., April-May, 1920.
 1830. The correlation of coal seams by means of spore exines (abstract): Science, new ser., vol. 51, p. 522, May 21, 1920.
 See also Hackford, no. 728.

Thomas, A. O.

1831. Notes on the geology of Antigua: Iowa, Univ., Studies, vol. 8, no. 3, pp. 213-219, May, 1919.
 1832. Echinoderms of the Iowa Devonian (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 211-212, March 31, 1920.
 1833. An illustration of the wedge work of roots: Iowa Acad. Sci., Proc., vol. 26, pp. 477-480, 1 fig. [1920].
 1834. A *Herpetocrinus* from the Silurian of Iowa: Iowa Acad. Sci., Proc., vol. 26, pp. 481-482, 1 fig. [1920].
 1835. The Independence shale near Brandon, Iowa: Iowa Acad. Sci., Proc., vol. 26, pp. 485-491 [1920].
 (with Lees, James H.). The Ste. Genevieve marls near Fort Dodge and their fauna: Iowa Acad. Sci., Proc. 1918, vol. 25, pp. 599-616, 1 pl. [1919].

Thomas, Kirby.

1836. Coal and oil in Rhode Island: Coal Age, vol. 15, p. 748, April 24, 1919.

Thompson, David G.

1837. Ground water in Lanfair Valley, California: U. S. Geol. Survey, Water-Supply Paper 450, pp. 29-50, 2 pls. (maps), 1 fig., January 15, 1920.

Thompson, J. D., jr.

- (with Malott, Clyde A.). The stratigraphy of the Chester series of southern Indiana (abstract): Science, new ser., vol. 51, pp. 521-522, May 21, 1920.

Thompson, Phillips.

1838. The Mackenzie River basin: Eng. and Min. Jour., vol. 108, pp. 866-868, 1 fig., December 6, 1919.

Thomson, Francis A.

1839. Notes on the antimony deposits [of Idaho]: Idaho, Univ., School of Mines, vol. 14, Bull. no. 2, pp. 45-53, January, 1919.
 1840. First annual report of the secretary of the State Bureau of Mines and Geology for the period April 20th to December 31st, 1919. 16 pp., Moscow, Idaho, 1920.

Thorpe, Malcolm Rutherford.

1841. Structural features of the Abajo Mountains, Utah: Am. Jour. Sci., 4th ser., vol. 48, pp. 379-389, 4 figs., November, 1918.
 1842. New species of Oligocene (White River) Felidae: Am. Jour. Sci., 4th ser., vol. 50, pp. 207-224, 10 figs., September, 1920.

Thwaites, F. T.

1843. (and Twenhofel, W. H.). Windrow formation, an upland gravel formation of the driftless and adjacent areas of the upper Mississippi Valley (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 133, March 31, 1920.

(with Twenhofel, W. H.). The Paleozoic section of the Tomah and Sparta quadrangles, Wisconsin: *Jour. Geology*, vol. 27, no. 8, pp. 614-633, 2 figs., November-December, 1919.

Tilley, Cecil E.

1844. A publication for geological abstracts: *Econ. Geology*, vol. 14, no. 7, pp. 570-572, November, 1919.

Tilton, John L.

1845. The Thurman-Wilson fault through southwestern Iowa, and its bearings: *Jour. Geology*, vol. 27, no. 5, pp. 383-390, 4 figs., July-August, 1919.

1846. Geology of Clarke County: *Iowa Geol. Survey*, vol. 27, pp. 105-169, 4 figs., map [1920].

1847. Geology of Cass County: *Iowa Geol. Survey*, vol. 27, pp. 171-176, 15 figs., 1 pl., map [1920].

1848. Note on conditions at the head of flood plains: *Iowa Acad. Sci., Proc.*, vol. 26, p. 391 [1920].

(with Gow, James E.). Geology of Adair County: *Iowa Geol. Survey*, vol. 27, pp. 277-344, 3 figs., 1 pl., map [1920].

Todd, James E.

1849. Certain diverse interpretations of Pleistocene in the Dakotas (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 134-135, March 31, 1920.

Tondorf, Francis A.

1850. The registration of earthquakes at the Georgetown University [District of Columbia] Station . . . January 1, 1916, to January 1, 1917: *Georgetown Univ., Seismographic Station, Bull.* no. 1, 23 pp., January 1, 1917.

1851. The registration of earthquakes at the Georgetown University [District of Columbia] Station . . . January 1, 1917, to January 1, 1918: *Georgetown Univ., Seismographic Station, Bull.* no. 2, 30 pp., January 1, 1918.

1852. The registration of earthquakes at the Georgetown University [District of Columbia] Station . . . January 1, 1918, to January 1, 1919: *Georgetown Univ., Seismographic Station, Bull.* no. 3, 31 pp., January 1, 1920.

1853. The registration of earthquakes at the Georgetown University [District of Columbia] Station . . . January 1, 1919, to January 1, 1920: *Georgetown Univ., Seismographic Station, Bull.* no. 4, 25 pp., January 1, 1920.

Tough, Fred B.

1854. (and Williston, Samuel H., and Savage, T. E.). Experiments in water control in the Flat Rock pool, Crawford County: *Illinois State Geol. Survey, Bull.* no. 40, pp. 97-140, 3 pls. (maps), 18 figs., 1919.

Tovote, W.

1855. The copper industry of the Southwest: Min. Mag., vol. 20, no. 5, pp. 267-275, 339-350, 6 figs., May and June, 1919.

1856. Certain ore deposits of the Southwest (with discussion): Am. Inst. Min. and Met. Eng., Trans., vol. 61, pp. 42-59, 1920.

Townley, Sidney D.

1857. Earthquakes on the Pacific coast of North America: Seismol. Soc. America, Bull., vol. 9, no. 3, pp. 72-85, September, 1919.

Trager, Earl A.

1858. A laboratory method for the examination of well cuttings: Econ. Geology, vol. 15, no. 2, pp. 170-176, 1 fig., March, 1920.

1859. A résumé of the oil-shale industry, with an outline of methods of distillation: Am. Assoc. Petroleum Geologists, Bull., vol. 4, no. 1, pp. 59-71, 6 figs., 1920.

Trelease, William.

1860. Bearing of the distribution of the existing flora of Central America and the Antilles on former land connections: Geol. Soc. America, Bull., vol. 29, no. 4, pp. 649-656, December 30, 1918.

Tristán, J. Fidel.

1861. Recent eruptions of Poás Volcano in Costa Rica: Zeitschr. Vulkanologie, Bd. 2, H. 3, pp. 140-146, 7 pls., January, 1916.

1862. (and Fernández Peralta, Ricardo). Informe presentado al Señor Ministro de Instrucción Pública sobre la actividad del volcán Irazú. Colegio de Señoritas Publicaciones, Serie A, no. 1, 1917 [not seen]. La Gaceta, Diario Oficial, año 39, no. 130, pp. 662-664, 6 figs., San José, Costa Rica, December 4, 1917.

Troxell, Edward Leffingwell.

1863. Study of the entelodonts (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 223, March 31, 1920.

1864. A tiny Oligocene artiodactyl, *Hypisodus alacer* sp. nov.: Am. Jour. Sci., 4th ser., vol. 49, pp. 391-398, 4 figs., June, 1920.

1865. Entelodonts in the Marsh collection: Am. Jour. Sci., 4th ser., vol. 50, pp. 243-255, 361-386, 431-445, 20 figs., 1 pl., October-December, 1920.

Tucker, W. M.

1866. Pyrite deposits in Ohio coal: Econ. Geology, vol. 14, no. 3, pp. 198-219, 3 figs., (maps), May, 1919.

Twenhofel, W. H.

1867. The chert of the Wreford and Foraker limestones along the State line of Kansas and Oklahoma: Am. Jour. Sci., 4th ser., vol. 47, pp. 407-429, 1 fig., June, 1919.

1868. Additional facts relating to the granite boulders of southeastern Kansas: Am. Jour. Sci., 4th ser., vol. 48, pp. 132-135, August, 1919.

1869. Pre-Cambrian and Carboniferous algal deposits: Am. Jour. Sci., 4th ser., vol. 48, pp. 339-352, 5 figs., November, 1919.

1870. (and Thwaites, F. T.). The Paleozoic section of the Tomah and Sparta quadrangles, Wisconsin: Jour. Geology, vol. 27, no. 8, pp. 614-633, 2 figs., November-December, 1919.

1871. The Comanchean and Dakota strata of Kansas: Am. Jour. Sci., 4th ser., vol. 49, pp. 281-297, 1 fig., April, 1920.

Twenhofel, W. H.—Continued.

1872. [The Cretaceous sediments of Kansas (discussion)]: *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 135-136, March 31, 1920.

1873. Revision of the Anticosti section (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 209, March 31, 1920.

(with Thwaites, F. T.). Windrow formation, an upland gravel formation of the driftless and adjacent areas of the upper Mississippi Valley (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 133, March 31, 1920.

See also Lee, no. 1026.

Twitchell, M. W.

1874. Our mineral industry in 1918: New Jersey, Dept. Conservation and Development, Ann. Rept. for 1919, pp. 105-115, 1919.

Tyrrell, J. B.

1875. Was there a "Cordilleran glacier" in British Columbia? *Jour. Geology*, vol. 27, no. 1, pp. 55-60, January-February, 1919.

1876. Notes on the placer mines of Cariboo, British Columbia: *Econ. Geology*, vol. 14, no. 4, pp. 335-345, 1 fig., June, 1919.

1877. The veins of Cobalt [Ontario] (discussion): *Econ. Geology*, vol. 15, no. 5, pp. 453-454, July-August, 1920.

Udden, Johan August.

1878. Fossil ice crystals; an instance of the practical value of "pure science": *Texas, Univ., Bull.* no. 1821, 8 pp., 10 pls., April 10, 1918.

1879. The anticlinal theory as applied to some quicksilver deposits: *Texas, Univ., Bull.* no. 1822, 30 pp., 16 figs., April 15, 1918. Review by W. H. Emmons, *Eng. and Min. Jour.*, vol. 107, pp. 916-917, 2 figs., May 24, 1919.

1880. Aids to identification of geological formations: *Texas, Univ., Bur. Econ. Geology and Technology, Handbook series no. 1*, 69 pp. [n. d., 1919?].

1881. (and Waite, V. V.). Microscopic characteristics of the Bend and the Ellenburger limestones. [*Texas, Univ., Bur. Econ. Geology, Austin, 1919.*] (Mimeographed, 25 pp., 10 photographs, edition limited.)

1882. (and Baker, C. L., and Böse, Emil). Review of the geology of Texas, 3d ed., revised 1919: *Texas, Univ., Bull.* 1916, no. 44: 178 pp., 12 figs., map [1919].

1883. Anticlinal theory as applied to some quicksilver deposits (abstract): *Geol. Soc. America, Bull.*, vol. 30, p. 112, March 31, 1919.

1884. Oil-bearing formations in Texas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 82-98, 1919.

1885. Observations on two deep borings near the Balcones faults [Texas] (with discussion): *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 124-131, 1919.

1886. Suggestions of a new method of making underground observations: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 1, pp. 83-85, 1 fig., 1920.

(with Waite, V. V.). Observations on the Bend [series] in Bough No. 1 in Brown County, Texas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 334-344, 1 fig., 1919.

Udden, John A.

1887. Subsurface geology of the oil districts of north central Texas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 34-38, 1919.

Uglov, W. L.

1888. Geology of platinum deposits: Eng. and Min. Jour., vol. 108, pp. 352-355, 390-393, August 30 and September 6, 1919.

1889. Possibilities for platinum in western Canada: Canadian Min. Inst., Monthly Bull. no. 95, pp. 207-220, March, 1920.

Ulrich, E. O.

1890. Newly discovered instances of early Paleozoic oscillations (abstract): Washington Acad. Sci., Jour., vol. 9, no. 10, pp. 297-298, May 19, 1919.

1891. Major causes of land and sea oscillations: Washington Acad. Sci., Jour., vol. 10, no. 3, pp. 57-78, 4 figs., February 4, 1920.

See also Winchester, no. 2018.

Umpleby, Joseph B.

1892. World view of mineral wealth (abstract): Geol. Soc. America, Bull., vol. 30, p. 107, March 31, 1919.

1893. (and Livingston, D. C.). A reconnaissance in south central Idaho embracing the Thunder Mountain, Big Creek, Stanley Basin, Sheep Mountain, and Seafoam districts: Idaho, Bur. Mines and Geology, Bull. no. 3, 23 pp., map, 5 pls., 1920.

United States Geological Survey.

1894. [Map of] State of West Virginia and part of Maryland; coal fields and producing districts, compiled by C. E. Leshner. Scale 1:1,000,000. 1919. [Similar maps of Virginia, Kentucky, Tennessee, Alabama and part of Georgia, Pennsylvania, Ohio, Indiana, Illinois.]

1895. [Map showing] oil and gas fields of the State of Kansas. Scale: 1 inch=12 miles. 1920.

Upham, Warren.

1896. Memorial of Charles Henry Hitchcock: Geol. Soc. America, Bull., vol. 31, no. 1, pp. 64-80, port., March 31, 1920.

1897. Drumlins at Lake Placid [New York] (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 128-130, March 31, 1920.

Urbina, Fernando.

1898. Los yacimientos petrolíferos submarinos: Bol. del Petróleo, vol. 5, no. 4, pp. 337-377, 15 pls., 3 maps, April, 1918.

(with Waitz, Paul). Los temblores de Guadalajara en 1912: México, Inst. Geol., Bol. no. 19, 83 pp., 32 pls., 1919.

Urrutia, Claudio.

1899. Determination of the azimuth in violent and local earthquakes: Seismol. Soc. America, Bull., vol. 9, no. 2, pp. 38-41, June, 1919.

Van Orstrand, C. E.

1900. Temperatures in some deep wells in the United States (abstract): Washington Acad. Sci., Jour., vol. 9, no. 13, p. 382, July 19, 1919.

Van Tuyl, Francis M.

1901. The physical history of the upper Mississippi Valley during the late Paleozoic (abstract): Illinois Acad. Sci., Trans., vol. 10, p. 280 [1918].

1902. (and Moore, Raymond C.). Late Mississippian orogenic movements in North America (abstract): Geol. Soc. America, Bull., vol. 30, pp. 88-89, March 31, 1919.

Van Tuyl, Francis M.—Continued.

1903. The Cripple Creek district of Colorado, a re-survey; geology and ore deposits: Colorado School of Mines, Quart., vol. 14, no. 3, pp. 5-10, 1 fig., July, 1919.

1904. The future of the petroleum industry in the United States: Colorado School of Mines Mag., vol. 10, no. 12, pp. 215-219, December, 1920. (with Savage, T. E.). Geology and stratigraphy of the area of Paleozoic rocks in the vicinity of Hudson and James bays: Geol. Soc. America. Bull., vol. 30, pp. 339-378, 3 pls., 4 figs. (paleogeographic maps), September 30, 1919.

Van Winkle, Katherine.

1905. (and Harris, G. D.). New or otherwise interesting Tertiary molluscan species from the east coast of America: Bull. American Paleontology, vol. 8, no. 33, pp. 1-32, 3 pls., March 6, 1919.

Varley, Thomas.

1906. (and others). A preliminary report on the mining districts of Idaho: U. S. Bur. Mines, Bull. 166, pp. 1-89, 2 pls. (maps), 1919.

(with Lewis, Robert S.). The mineral industry of Utah: Utah, Univ., Bull., vol. 10, no. 11 (Utah Engineering Station, Department of Metallurgical Research, Bull. no. 12), 201 pp., map (mining districts), December, 1919.

Vaughan, Thomas Wayland.

1907. Geologic history of central America and the West Indies during Cenozoic time: Geol. Soc. America, Bull., vol. 29, no. 4, pp. 615-630, December 30, 1918.

1908. (and others). Contributions to the geology and paleontology of the West Indies: Carnegie Inst. Washington, Pub. no. 291, 184 pp., pls., 1919.

1909. Contributions to the geology and paleontology of the Canal Zone, Panama, and geologically related areas in Central America and the West Indies; Fossil corals from Central America, Cuba, and Porto Rico, with an account of the American Tertiary, Pleistocene, and recent coral reefs: U. S. Nat. Mus., Bull. 103, pp. 189-524, 85 pls., 21 figs., 1919.

1910. Contributions to the geology and paleontology of the Canal Zone, Panama, and geologically related areas in Central America and the West Indies; the biologic character and geologic correlation of the sedimentary formations of Panama in their relation to the geologic history of Central America and the West Indies: U. S. Nat. Mus., Bull. 103, pp. 547-612, 1919.

1911. Corals and the formation of coral reefs: Smithsonian Inst., Ann. Rept., 1917, pp. 189-276, 37 pls., 16 figs., 1919.

1912. Presentation of geologic information for engineering purposes (abstract): Geol. Soc. America, Bull., vol. 30, pp. 79-80, March 31, 1919.

1913. [Report on] study of the stratigraphic geology and of the fossil corals and associated organisms in several of the smaller West Indian islands: Carnegie Inst. Washington, Year Book no. 18, 1919, pp. 345-346, March, 1920.

1914. Features of the shifts of land and sea-level in the Atlantic and Gulf Coastal Plain during Pleistocene and post-Pleistocene time (abstract, with discussion by W. T. Lee): Geol. Soc. America, Bull. vol. 31, no. 1, p. 113, March 31, 1920.

Vaughan, Thomas Wayland—Continued.

1915. Stratigraphy of the Virgin Islands of the United States and of Culebra and Vieques islands (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 216-217, March 31, 1920.

1916. Corals from the Cannonball marine member of the Lance formation: *U. S. Geol. Survey, Prof. Paper* 128, pp. 61-66, 1 pl., August 11, 1920.

1917. Researches on sedimentation: *Geol. Soc. America, Bull.*, vol. 31, no. 4, pp. 401-410, November 30, 1920.

Vickery, Frederick P.

1918. The San Jose [California] earthquake: *Seismol. Soc. America, Bull.*, vol. 10, no. 4, pp. 311-315, 2 figs., 1 pl., December, 1920.

Visher, Stephen Sargent.

1919. The geography of South Dakota: *South Dakota State Geol. and Nat. Hist. Survey, Bull.* 8, pp. 1-177, 52 figs., July, 1918.

1920. Geology of the Sullivan County, Indiana, oil field (abstract): *Science, new ser.*, vol. 51, p. 493, May 14, 1920.

1921. Climate and geology (abstract): *Science, new ser.*, vol. 51, pp. 522-523, May 21, 1920.

Wade, Bruce.

1922. Recent studies of the Upper Cretaceous of Tennessee: *Jour. Geology*, vol. 28, no. 5, pp. 377-394, 2 figs., July-August, 1920. *Tennessee State Geol. Survey, Bull.* 23 (Pt. 1, Ann. Rept. 1919), pp. 51-64, 2 figs., 4 pls. (incl. map), 1920.

Wade, W. Rogers.

1923. (and Wandtke, Alfred). Geology and mining methods at Pilares mine [Los Pilares de Nacozari, Sonora, Mexico]: *Am. Inst. Min. and Met. Eng., Bull.* no. 152, pp. 1143-1169, 14 figs., August, 1919; *Trans.*, vol. 63, pp. 382-407, 14 figs., 1920.

Waite, V. V.

1924. (and Udden, J. A.). Observations on the Bend [series] in Bough No. 1 in Brown County, Texas: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 3, pp. 334-344, 1 fig., 1919.

(with Udden, J. A.). Microscopic characteristics of the Bend and the Ellenburger limestones. [Texas, Univ. Bur. Econ. Geology, Austin, 1919.] (Mimeographed, 25 pp., 10 photographs, edition limited.)

Waitz, Paul.

1925. (and Urbina, Fernando). Los temblores de Guadalajara en 1912: *México, Inst. Geol., Bol.* no. 19, 83 pp., 32 pls., 1919.

1926. Descripción petrográfica de unas rocas de Zumpango del Río (Guerro) [México]: *México, Inst. Geol., Bol.* no. 33, t. 1, pp. 85-89, 1919.

1927. "Nubes ardentes" observadas en las erupciones del Jorullo (1759), del Ceboruco (1870), y del volcán de Colima (1913): *El volcán del Jorullo; La nueva actividad y el estado actual del volcán Popocatepetl*: *Soc. cient. "Antonio Alzate," Mem. y Rev.*, t. 37, nos. 4-6, pp. 267-313, 12 pls., December, 1920.

Walcott, Charles D.

1928. Glacier Lake section, Alberta: Smithsonian Misc. Coll., vol. 72, no. 1, p. 15, 1920.
1929. Appendages of trilobites (Smithsonian Misc. Coll., vol. 67, no. 4, 1918) (abstract by G. R. Brigham): Washington Acad. Sci., Jour., vol. 9, no. 8, pp. 229-231, April 19, 1919.
1930. Thirty million years ago; newly discovered pre-Cambrian sea where in earth's first creatures were born: Sci. Am., vol. 120, pp. 682-683, 698, 6 figs., June 28, 1919.
1931. Cambrian geology and paleontology, IV; No. 5, Middle Cambrian Algae: Smithsonian Misc. Coll., vol. 67, no. 5, pp. 217-260, 17 pls., December, 26, 1919.
1932. Cambrian geology and paleontology, IV; No. 6, Middle Cambrian Spongiae: Smithsonian Misc. Coll., vol. 67, no. 6, pp. 261-364, 31 pls., 1920.

Waldschmidt, W. A.

1933. The largest known beryl crystal: Pahasapa Quart., vol. 9, no. 1, pp. 11-16, 3 pls., 1 fig., December, 1919.
1934. Columbite crystals from the Black Hills: Pahasapa Quart., pp. 67-71, 2 pls., 4 figs., February, 1920.
1935. A peculiar occurrence of epsomite in the Black Hills: Pahasapa Quart., vol. 9, no. 3, pp. 138-140, 1 fig., April, 1920.

Walker, T. L.

1936. Mineralogy of the H. B. mine, Salmo, B. C.: Toronto, Univ., Studies, geol. ser. no. 10, 25 pp., 10 figs., 1918.
1937. Stalactitic barite from Madoc, Ontario: Am. Mineralogist, vol. 4, no. 7, pp. 79-80, 1 pl., July, 1919.
1938. Fluorite from Madoc, Ontario: Am. Mineralogist, vol. 4, no. 8, pp. 95-96, 1 fig., August, 1919.

Wallace, R. C.

1939. Mining development in northern Manitoba: Canadian Min. Inst., Monthly Bull., no. 83, pp. 287-296, March, 1919; Trans., vol. 22, pp. 329-340 [1920].
1940. The northern Manitoba field: Canadian Min. Jour., vol. 40, pp. 549-550, July 23, 1919.
1941. The gold discovery at Copper Lake, northern Manitoba: Canadian Min. Jour., vol. 40, pp. 731-733, October 1, 1919.
1942. Progress in the northern Manitoba mineral belt: Canadian Min. Jour., vol. 40, pp. 843-846, 1 fig., November 12, 1919.

Wandke, Alfred.

1943. Geology of the Portsmouth basin, Maine and New Hampshire (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 138, March 31, 1920.
- (with Wade, W. Rogers). Geology and mining methods at Pilares mine [Los Pilares de Nacozari, Sonora, Mexico]: Am. Inst. Min. and Met. Eng., Bull. no. 152, pp. 1143-1169, 14 figs., August, 1919; Trans., vol. 63, pp. 382-407, 14 figs., 1920.

Ward, Freeman.

1944. Biennial report of the State geologist, 1916-1918: South Dakota State Geol. and Nat. Hist. Survey, Bull. 8, pp. 179-189, July, 1918.

Ward, Freeman—Continued.

- 1945. The possibilities of oil and gas in Harding County: South Dakota Geol. and Nat. Hist. Survey, Circular no. 4, 8 pp., October, 1918.
- 1946. Chalk: South Dakota Geol. and Nat. Hist. Survey, Circular 6, 4 pp., November, 1919.
- 1947. Report of the State geologist [of South Dakota], 1918-1920. 15 pp., Daily Leader, Madison, S. D. [1920].
- 1948. The Quaternary geology of the New Haven region, Connecticut: Connecticut State Geol. and Nat. Hist. Survey, Bull. no. 29, 78 pp., 9 pls. (incl. maps), 17 figs., 1920.

Waring, Gerald A.

- 1949. Ground water in Reese River basin and adjacent parts of Humboldt River basin, Nevada (U. S. Geol. Survey, Water-Supply Paper 425, pp. 95-129, 1918) (abstract): Washington Acad. Sci., Jour., vol. 10, no. 16, p. 473, October 4, 1920.
- 1950. Ground water in the San Jacinto and Temecula basins, California: U. S. Geol. Survey, Water-Supply Paper 429, 113 pp., 14 pls. (incl. maps), 15 figs., 1919. Abstract, Washington Acad. Sci., Jour., vol. 10, no. 16, pp. 472-473, October 4, 1920.
- 1951. Ground water in the Meriden area, Connecticut: U. S. Geol. Survey, Water-Supply Paper 449, 83 pp., 10 figs., 7 pls. (incl. maps), 1920.
- 1952. Ground water in Pahrump, Mesquite, and Ivanpah valleys, Nevada and California: U. S. Geol. Survey, Water-Supply Paper 450, pp. 51-81, 5 pls., (incl. maps), 2 figs., 1920.

Washburne, Chester W.

- 1953. Some physical principles of the origin of petroleums: Am. Assoc. Petroleum Geologists, Bull., vol. 3, pp. 345-362, 1919.
 - 1954. A discussion of "Notes on principles of oil accumulation" by A. W. McCoy: Jour. Geology, vol. 28, no. 4, pp. 366-370, May-June, 1920.
 - 1955. Oil field brines: Mining and Metallurgy, no. 164, p. 27, August, 1920 (abstract); Am. Inst. Min. and Met. Eng., Trans. [preprint no. 1010], 13 pp., 1920; discussion by R. V. A. Mills, E. DeGolyer, W. E. Pratt, R. A. Conkling, and C. W. Washburne [preprint] no. 1038, pp. 71-84, January, 1921.
- See also Melcher, no. 1261; Woodruff, no. 2075.

Washington, Henry S.

- 1956. Manual of the chemical analysis of rocks. Third edition, 271 pp., New York, John Wiley & Sons, 1919.
- 1957. Italite, a new leucite rock: Am. Jour. Sci., 4th ser., vol. 50, pp. 33-47, July, 1920.
- 1958. The problems of volcanology: Nat. Acad. Sci., Proc., vol. 6, no. 10, pp. 583-592, October 15, 1920. Nat. Research Council, Reprint and Circular Ser., no. 11, pp. 583-592, 1920.

Watson, John Wilbur.

- 1959. Abstraction of potassium during sedimentation. Diss., Univ. Virginia, 30 pp. [no date, 1913?].

Watson, Thomas Leonard.

- 1960. Administrative report of the State geologist for the biennial period 1916-1917: Virginia Geol. Survey, 36 pp., Charlottesville, 1918.
- 1961. Cerium, its occurrence and application: Mineral Foote-Notes, vol. 3, no. 3, pp. 4-10, May-June, 1919.

Watson, Thomas Leonard—Continued.

- 1962. Glass-sand resources of Virginia: *Am. Ceramic Soc., Jour.*, vol. 2, no. 10, pp. 794-803, October, 1919.
- 1963. Earthquake in Warren and Rappahannock counties, Virginia, September 5, 1919: *Seismol. Soc. America, Bull.*, vol. 9, no. 4, pp. 128-134, 4 figs., December, 1919.
- 1964. Alabama meeting of the Association of American State Geologists: *Science*, new ser., vol. 51, pp. 19-20, January 2, 1920.
- 1965. Note on the composition of allanite: *Am. Mineralogist*, vol. 5, no. 1, pp. 6-7, January, 1920.
- 1966. Bearing of experimental data on the formation of smithsonite (abstract): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 161-162, March 31, 1920.
- 1967. Administrative report of the State geologist for the biennial period 1918-1919. 31 pp., map, Virginia Geol. Survey, 1920.

Watts, W. L.

- 1968. Geological structures favorable to the accumulation of petroleum: *Southern California Acad. Sci., Bull.*, vol. 19, pt. 1, pp. 13-20, 7 figs., January, 1920.

Weaver, Charles E.

- 1969. Geological history of Washington. In *Northwest Mines Handbook*, vol. 1, pp. 143-145, published by Sidney Norman, Spokane, Washington, 1918.
- 1970. The mineral resources of Stevens County: *Washington Geol. Survey, Bull.*, no. 20, 350 pp., 20 pls. (incl. map), 14 figs., 1920.

Wegeman, Carroll H.

- 1971. Notes on the oil fields of Wyoming: *Am. Assoc. Petroleum Geologists, Bull.*, vol. 4, no. 1, pp. 37-42, 1920. *Eng. and Min. Jour.*, vol. 109, pp. 1417-1419, June 26, 1920.

Weld, C. M.

- 1972. [Iron-ore resources of] Cuba: *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 124-130, 1920.

Weller, Stuart.

- 1973. (with the collaboration of Charles Butts, L. W. Currier, and R. D. Salisbury). The geology of Hardin County and the adjoining part of Pope County: *Illinois State Geol. Survey, Bull.* no. 41, 416 pp., 30 figs., 11 pls., 1920.
- 1974. The Chester series in Illinois: *Jour. Geology*, vol. 28, nos. 4 and 5, pp. 281-303, 395-416, 1 fig., 1920.
- 1975. The Chester series in Illinois (abstract): *Science*, new ser., vol. 51, p. 494, May 14, 1920.
- 1976. Fossils as aids in teaching stratigraphy, or applied paleontology: *Geol. Soc. America, Bull.*, vol. 31, no. 3, pp. 383-388, September 30, 1920.

Wells, E. H.

- 1977. Manganese in New Mexico: *New Mexico State School of Mines, Bull.* no. 2, *Min. Res. Survey*, 85 pp., map, 1918.
- 1978. Oil and gas possibilities of the Puertecito district, Socorro and Valencia counties, New Mexico: *New Mexico State School of Mines, Bull.* no. 3, *Mineral Resources Survey*, 47 pp., map, Socorro, N. M., 1919.

- Wells, Roger C.
 1979. Sodium salts in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 2, pp. 305-341, January 27, 1919.
 1980. Sodium and sodium compounds in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 159-198, October 24, 1919.
 1981. Sodium compounds in 1919: U. S. Geol. Survey, Mineral Resources, 1919, pt. 2, pp. 47-76, 1920.
 1982. An unusual deposit of aragonite from sea water: Washington Acad. Sci., Jour., vol. 10, no. 9, pp. 249-254, May 4, 1920.
 (with Mills, R. Van A.). The evaporation and concentration of waters associated with petroleum and natural gas: U. S. Geol. Survey, Bull. 693, 104 pp., 4 pls., 5 figs., 1919. Abstract, Washington, Acad. Sci., Jour., vol. 9, no. 17, pp. 259-530, October 19, 1919.
 (with Hess, Frank L.). Brannerite, a new uranium mineral, Stanley Basin, central Idaho: Franklin Inst., Jour., vol. 189, no. 2, pp. 225-237, 2 figs., February, 1920; no. 6, pp. 779-780, June, 1920.
- Wentworth, Chester K.
 1983. A laboratory and field study of cobble abrasion: Jour. Geology, vol. 27, no. 7, pp. 507-521, 28 figs., October-November, 1919.
- Westcott, Henry P.
 1984. Handbook of natural gas. 3d ed., 725 pp., 255 figs., Erie, Pennsylvania, Metric Metal Works, 1920.
- Westgate, Lewis G.
 1985. Deposits of iron ore near Stanford, Montana: U. S. Geol. Survey, Bull. 715, pp. 85-92, 4 figs. (incl. maps), September 16, 1920.
- Wheeler, Arthur O.
 1986. Notes on the glaciers of the main and Selkirk ranges of the Canadian Rocky Mountains: Canadian Alpine Jour., vol. 11, pp. 121-146, 7 pls., 1920.
 1987. Motion of the Yoho Glacier, 1917, 1918, and 1919: Canadian Alpine Jour., vol. 11, pp. 182-185, 1 pl. 1920.
- Wheeler, Harold L.
 1988. Bibliography of the occurrence, geology, and mining of manganese with some references on its metallurgy and uses: Econ. Geology, vol. 14, no. 3, pp. 245-261, May, 1919.
- Wheeler, Herbert Allen.
 1989. North Texas oil fields: Eng. and Min. Jour., vol. 109, pp. 741-747, 2 figs., March 27, 1920.
 1990. The North Texas oil fields: Eng. and Min. Jour., vol. 109, pp. 1317-1319, June 12, 1920.
 1991. Rapid formation of lead ore: Mining and Metallurgy, no. 158, sec. 1, p. 35, 1 fig. (abstract), sec. 25, 4 pp., 1 fig. February, 1920; (with discussion by Frank L. Nason, James F. Kemp, H. V. Winchell, W. Lindgren, S. H. Ball, Alan M. Bateman, and E. S. Moore), Am. Inst. Min and Met. Eng., Trans., vol. 63, pp. 311-323, 1 fig., 1920.
- Wheeler, O. C.
 (with Christner, D. D.). The geology of Terrell county: Texas Univ. Bull. no. 1819, pp. 1-32, 8 pls., (incl. map), April 1, 1918.

Wherry, Edgar T.

- 1992. (and Adams, Elliot Q.). The classification of mimetic crystals: Washington Acad. Sci., Jour., vol. 9, no. 6, pp. 153-157, March 19, 1919.
- 1993. Chalcopyrite crystals from the Bergen archways [New Jersey]: Am. Mineralogist, vol. 4, no. 9, pp. 116-118, 2 figs., September, 1919.
- 1994. Monazite from Boothwyn, Pennsylvania: Am. Mineralogist, vol. 4, no. 10, pp. 123-124, 1 pl., October, 1919.
- 1995. Phenol red indicator as an aid to the geologist (abstract): Geol. Soc. American, Bull., vol. 31, no. 1, p. 161, March 31, 1920.
- 1996. Illustration of the isometric system: pyrite from Falls of French Creek, Pennsylvania; Am. Mineralogist, vol. 5, no. 6, pp. 116-117, June, 1920.
- 1997. Lists of the isometric minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 6, pp. 117-119, June, 1920.
- 1998. Lists of the tetragonal minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 7, pp. 132-133, July, 1920.
- 1999. Lists of the hexagonal and trigonal minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 8, pp. 150-152, August, 1920.
- 2000. The nomenclature and classification of sulphide minerals: Washington Acad. Sci., Jour., vol. 10, no. 17, pp. 487-496, October 19, 1920.
- 2001. Lists of the orthorhombic minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 9, pp. 164-166, September, 1920.
- 2002. Lists of the monoclinic minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 10, pp. 181-182, October, 1920.
- 2003. List of triclinic minerals included in Goldschmidt's Winkeltabellen: Am. Mineralogist, vol. 5, no. 12, p. 208, December, 1920.
(with Lee, O. Ivan.). Manganotantalite from Amelia, Virginia: Am. Mineralogist, vol. 4, no. 7, pp. 80-83, 2 figs., July, 1919.
See also Davy, no. 475.

White, David.

- 2004. Genetic problems affecting search for new oil regions: Mining and Metallurgy, no. 158, sec. 1, p. 32 (abstract), sec. 21, 20 pp., February, 1920. Abstract, Eng. and Min. Jour., vol. 109, pp. 512-514, February 21, 1920. Discussion by R. H. Johnson, H. W. Hixon, David Reger, and J. F. Duce [Am. Inst. Min. and Met. Eng., Trans., preprint no. 994, pp. 9-12, 1920].
- 2005. The petroleum resources of the world: Am. Acad. Political and Social Science, vol. 89, no. 178, pp. 111-134, pls. (maps), May, 1920.
See also Hackford, no. 728; Johnson, no. 939; Semmes, no. 1657; Willis, no. 2047; Winchester, no. 2059.

White, I. C.

- 2006. West Virginia's second deepest well of the world, the I. H. Lake No. 1, No. 4304 of the Hope Natural Gas Company's West Virginia series: Ohio Gas and Oil Men's Jour., vol. 1, no. 2, pp. 17-22, September, 1919.
- 2007. Some results of deep drilling in the Appalachian oil and gas fields (abstract with discussion by A. C. Lane): Geol. Soc. America, Bull., vol. 31, no. 1, p. 157, March 31, 1920.

White, I. C.—Continued.

2008. Geographic distribution of sulphur in West Virginia coal beds: *Am. Inst. Min. and Met. Eng., Bull.* no. 153, pp. 2197-2206, 8 figs., September, 1919; *Trans.*, vol. 63, pp. 932-844, 8 figs., 1920. Discussion, *Mining and Metallurgy*, no. 157, pp. 51-53, January, 1920.

White, James.

2009. Coal resources of western Canada: *Coal Age*, vol. 15, pp. 744-748, 858-862, 4 figs., 1919.

Whitehead, W. L.

2010. The veins of Cobalt, Ontario: *Econ. Geology*, vol. 15, no. 2, pp. 103-135, 2 pls., 5 figs., March, 1920.

Whitlock, Herbert P.

2011. René Just Haüy and his influence: *New York State Mus. Bull.*, nos. 207, 208, pp. 149-155, 1 pl. (port.), 1919.
2012. Crystallographic studies of barite: *New York State Mus. Bull.*, nos. 207, 208, pp. 157-164, 7 figs., 1919.
2013. Pyrite crystals from Broadway and 207th Street, New York City: *Am. Mineralogist*, vol. 4, no. 4, pp. 31-32, 1 pl., April, 1919.
2014. Pyrite crystals from Bald Mountain, Colorado: *Am. Mineralogist*, vol. 4, no. 6, pp. 67-68, 2 figs., June, 1919.
2015. The Mineralogical Society of America: *Science*, new ser., vol. 51, pp. 219-220, February 27, 1920.
2016. Wood turned to opal: *Natural History*, vol. 20, no. 1, p. 82, January-February, 1920.
2017. A model for demonstrating crystal structure: *Am. Jour. Sci.*, 4th ser., vol. 49, pp. 259-264, 13 figs., April, 1920.
2018. Alfred J. Moses, 1859-1920: *Science*, new ser., vol. 51, pp. 429-430, April 30, 1920.
2019. Obituary, Alfred J. Moses, 1859-1920: *Am. Jour. Sci.*, 4th ser., vol. 49, p. 389, May, 1920.

Whitman, Alfred R.

2020. Diffusion in vein genesis at Cobalt [Ontario]: *Econ. Geology*, vol. 15, no. 2, pp. 136-149, March, 1920.

Whitson, A. R.

2021. (and others). Reconnaissance soil survey of south part of north central Wisconsin: *Wisconsin Geol. and Nat. Hist. Survey, Bull.* no. 52 A (soil ser. no. 16), 108 pp., map, 4 pls., 3 figs., 1918.
2022. (and others). Soil survey of Door County, Wisconsin: *Wisconsin Geol. and Nat. Hist. Survey, Bull.* no. 52 D (soil ser. no. 19), 72 pp., 3 figs., map, 1919.
2023. (and others). Soil survey of Milwaukee County, Wisconsin: *Wisconsin Geol. and Nat. Hist. Survey, Bull.* no. 56 A (soil ser. no. 28), 63 pp., 3 figs., map, 1919.

Wichman, F. M.

2024. The Ophir mining district, Utah: *Eng. and Min. Jour.*, vol. 110, no. 12, pp. 560-563, 3 figs., September 18, 1920.

Wickham, H. F.

2025. Fossil beetles from Vero, Florida: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 355-357, May, 1919. *Florida State Geol. Survey, Twelfth Ann. Rept.*, pp. 5-7, 1919.

Wieland, G. R.

- 2026. [Paleobotanical studies]: Carnegie Inst. Washington, Year Book no. 17, 1918, pp. 312-314, February, 1919; no. 18, 1919, pp. 362-363, March, 1920.
- 2027. Distribution and relationship of the cycadeoids: Am. Jour. Botany, vol. 7, no. 4, pp. 125-145, 5 figs., 1 pl., April, 1920.
- 2028. The *Tetracentron-Drimys* question: Am. Jour. Sci., 4th ser., vol. 49, pp. 382-383, May, 1920.
- 2029. The long-neck sauropod *Barosaurus*: Science, new ser., vol. 51, pp. 528-530, May 28, 1920.
- 2030. Classification of the Cycadophyta: Am. Jour. Sci., 4th ser., vol. 47, pp. 392-406, 3 figs., June, 1919.
- 2031. Recedent lake shores of the Cretaceous: Science, new ser., vol. 52, pp. 537-538, December 3, 1920.

Williams, Edward H., jr.

- 2032. The deep Kansan pondings in Pennsylvania and the deposits therein: Am. Philos. Soc., Proc., vol. 59, no. 1, pp. 49-84, 15 figs., 1920.

Williams, Ira A.

- 2033. The Oregon caves; remarkable "marble halls" of Josephine County: Natural History, vol. 20, no. 4, pp. 397-405, 10 figs., September-October, 1920.

Williams, Merton Y.

- 2034. The Silurian geology and faunas of Ontario Peninsula, and Manitoulin and adjacent islands: Canada, Geol. Survey, Mem. 111, 195 pp., 34 pls., 6 figs., 2 maps, 1919.
- 2035. Oil fields of southwestern Ontario: Canada, Geol. Survey, Summ. Rept., 1918, pt. E, pp. 30-41, 2 figs., map, 1919.
- 2036. Future prospects for oil and gas production in Ontario: Canadian Min. Inst., Monthly Bull., no. 96, pp. 320-325, April, 1920.
- 2037. The geology of Ontario as it affects gas and oil production: Canadian Min. Jour., vol. 40, p. 655, September 3, 1919.
- 2038. The oil fields of Elgin, Essex, and the southern part of Kent counties, Ontario: Canada, Geol. Survey, Summ. Rept., 1919, pt. E, pp. 7-16, 1920.
- 2039. Oil occurrence in a syncline in the Trenton formation of Kent County: Canada, Geol. Survey, Summ. Rept., 1919, pt. E, pp. 16-18, 3 pls., 1920.
- 2040. Paleozoic rocks of Mattagami and Abitibi rivers, Ontario: Canada, Geol. Survey, Summ. Rept., 1919, pt. G, pp. 1-12, 2 figs., 1920.
- 2041. Paleozoic geology of the Mattagami and Abitibi rivers: Ontario Bur. Mines, 29th Ann. Rept. vol. 29, pt. 2, pp. 19-30, 1 fig., 1920.
- 2042. Paleozoic sections south of James Bay (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, pp. 138-139, March 31, 1920.

Williamson, E. D.

- 2043. Earthquakes and the elastic properties of the earth (abstract): Washington Acad. Sci., Jour., vol. 10, no. 17, p. 498, October 19, 1920.

Willis, Bailey.

- 2044. Structure of the Pacific ranges, California (abstract, with discussion by R. T. Chamberlin, A. Keith, G. R. Mansfield, and G. W. Stose): Geol. Soc. America, Bull., vol. 30, pp. 84-86, March 31, 1919.

Willis, Bailey—Continued.

2045. Discoidal structure of the lithosphere: *Nat. Acad. Sci., Proc.*, vol. 5, no. 9, pp. 377-383, September 15, 1919.
2046. Joseph Barrell and his work: *Jour. Geology*, vol. 27, no. 8, pp. 664-672, November-December, 1919.
2047. Geologic distillation of petroleum: *Mining and Metallurgy*, no. 157, sec. 1, p. 49 (abstract), sec. 10, 7 pp., January, 1920; *Am. Inst. Min. and Met. Eng., Trans.* [preprint], no. 1088, pp. 18-20, August, 1921. *Oil and Gas Jour.*, vol. 18, no. 43, pp. 54-55, March 26, 1920. Discussion by David Reger, David White, H. W. Hixon, and E. W. Shaw [*Am. Inst. Min. and Met. Eng., Trans.* [preprint no. 994, pp. 12-19, 1920]].
2048. Structure of the coast ranges of California (abstract with discussion): *Geol. Soc. America, Bull.*, vol. 31, no. 1, p. 193, March 31, 1920.
2049. Discoidal structure of the lithosphere: *Geol. Soc. America, Bull.*, vol. 31, no. 2, pp. 247-302, 6 pls., 2 figs., June 30, 1920.

Williston, Samuel H.

- (with Tough, Fred B., and Savage, T. E.). Experiments in water control in the Flat Rock pool, Crawford County: *Illinois State Geol. Survey, Bull.* no. 40, pp. 97-140, 3 pls. (maps), 18 figs., 1919.

Willson, K. M.

- (with Crawford, R. D., and Perini, V. C.). Some anticlines of Routt County, Colorado: *Colorado Geol. Survey, Bull.* 23, 61 pp., 10 figs., 3 pls. (incl. map), 1920.

Wilson, Eldred D.

- (with Jenkins, Olaf P.). A geological reconnaissance of the Tucson and Amole Mountains: *Arizona, Univ., Bull.* no. 106 (geol. ser. no. 2), pp. 5-18, 7 figs., 3 pls., May, 1920.
- (with Jenkins, Olaf P.). List of United States Geological Survey publications relating to Arizona: *Arizona, Univ., Bull.* no. 104 (geol. ser. no. 1), 40 pp., 1920.

Wilson, Ernest H.

2050. Barite from Great Notch, New Jersey: *Am. Mineralogist*, vol. 4, no. 1, p. 4, January, 1919.

Wilson, Morley E.

2051. Geology and mineral deposits of a part of Amherst township, Quebec: *Canada, Geol. Survey, Mem.* 113, 54 pp., 7 pls., 3 figs., map, 1919.
2052. (and MacKay, B. R.). Landslide adjacent to Riviere Blanche, St. Thuribe, Parish of St. Casimir, Portneuf County, Province of Quebec: *Quebec (Province), Rept. on Mining Operations*, 1918, pp. 152-156, 2 pls., 1919.
2053. Mineral deposits in the Ottawa Valley: *Canada, Geol. Survey, Summ. Rept.*, 1919, pt. E., pp. 19-44, 10 figs., 3 maps, 1920.
2054. Molybdenite in the lower Ottawa Valley: *Canadian Inst. Min. and Metal., Monthly Bull.*, no. 102, pp. 749-754, 3 figs., October, 1920.

Wilson, Philip D.

2055. Notes on certain ore deposits of the Southwest (discussion): *Am. Inst. Min. Eng., Bull.* no. 146, pp. 445-447, February, 1919.

Wilson, W. J.

2056. Notes on some fossil plants from New Brunswick: *Canada Geol. Survey, Summ. Rept.*, 1917, pt. F, pp. 15-17, 1918.

Winchell, Alexander N.

2057. (and Miller, E. R.). Further notes on the dust fall of March 9, 1918: *Am. Jour. Sci.*, 4th ser., vol. 47, pp. 133-134, February, 1919.

2058. (and others). Handbook of mining in the Lake Superior region. Prepared for the Lake Superior meeting of the American Institute of Mining and Metallurgical Engineers, held in August, 1920. 260 pp., illus. (incl. maps) [Minneapolis, 1920].

Winchell, H. V. See Wheeler, no. 1950.

Winchester, Dean E.

2059. Contorted bituminous shale of Green River formation in northwestern Colorado (abstract with discussion by E. O. Ulrich, David White, W. C. Alden, and G. H. Ashley): *Washington Acad. Sci., Jour.*, vol. 9, no. 10, pp. 295-296, May 19, 1919.

2060. Oil shales: *Franklin Inst., Jour.*, vol. 187, no. 6, pp. 689-703, June, 1919.

2061. Geology of Alamosa Creek valley, Socorro County, New Mexico, with special reference to the occurrence of oil and gas: *U. S. Geol. Survey, Bull.* 716, pp. 1-15, 5 pls. (incl. map), 1920.

Winton, W. M.

2062. (and Adkins, W. S.). The geology of Tarrant County: Texas, Univ., *Bull.* no. 1931, 123 pp., 6 pls., 6 figs., 2 maps, 1920.

(with Adkins, W. S.). Paleontological correlation of the Fredericksburg and Washita formations in north Texas: Texas, Univ., *Bull.* no. 1945, 128 pp., 22 pls., 6 figs., August 10, 1919 [pub. January, 1920].

Wittich, Ernesto.

2063. Ueber Lavahöhlen im Pedregal von San Angel bei Mexiko: *Neues Jahrb.*, Bd. 1, H. 3, pp. 126-133, 4 pls., July 29, 1916.

2064. Fenómenos desérticos en los alrededores de San Luis Potosí: *Soc. cient. "Antonio Alzate," Mem. y Rev.*, t. 37, no. 2, pp. 65-70, 3 pls., January, 1919.

2065. Los fenómenos microvolcánicos en el Pedregal de San Ángel: *Soc. cient. "Antonio Alzate," Mem. y Rev.*, t. 38, no. 3-4, pp. 101-120, 8 pls., March, 1919.

2066. Apuntes preliminares acerca de la zona minera de Guadalcázar, S. L. P. [San Luis Potosí, México]: *Petróleo*, vol. 13, no. 196, pp. 5-6, April 10, 1920.

2067. La fluorita en los criaderos de contacto y de cinabrio de Guadalcázar, S. L. P. [San Luis Potosí, México]: *Petróleo*, vol. 13, no. 197, p. 10, April 17, 1920.

2068. Apuntes acerca del azufre con betún de las minas de Huascamá, Cerritos, S. L. P. [San Luis Potosí, México]: *Boletín Minero*, t. 9, nos. 5-6, pp. 614-616, May-June, 1920.

2069. Observaciones acerca de placeres de cinabrio y oro, encontrados en el distrito de Guadalcázar, S. L. P. [San Luis Potosí, México]: *Boletín Minero*, t. 10, nos. 3-4, pp. 253-256, September-October, 1920.

2070. La emersión moderna de la costa occidental de la Baja California: *Soc. cient. "Antonio Alzate," Mem.*, t. 35, nos. 3-4, pp. 121-144, 10 pls., 1 fig., August, 1920.

2071. Estudios geológicos sobre el mineral de El Chico, Hidalgo: *Soc. cient. "Antonio Alzate," Mem.*, t. 38, nos. 9-10, pp. 321-349, 6 pls., July, 1920.

Wolf, Alfred G.

2072. Gulf coast salt domes: *Colorado School of Mines Mag.*, vol. 10, no. 9, pp. 171-177, 3 figs., September, 1920.

Wolff, John E.

2073. Charles Richard Van Hise (1857-1918): *Am. Acad. Arts and Sci. Proc.*, vol. 55, no. 10, pp. 511-512, November, 1920.

Wolff, Julius F.

2074. Recent geologic development on the Mesabi iron range, Minnesota (discussion): *Am. Inst. Min. and Met. Eng., Trans.*, vol. 61, pp. 113-115, 1920.

Woodruff, E. G.

2075. Petroliferous provinces: *Am. Inst. Min. and Met. Eng., Bull.*, no. 150, pp. 907-912, 1 fig., June, 1919. Discussion by Irving Perrine and C. W. Washburne, *Bull.* no. 156, pp. 3146-3147, December, 1919.

2076. Notebook form and symbols for petroleum geologists: *Econ. Geology*, vol. 14, no. 5, pp. 424-426, 2 figs., August, 1919.

See also Brokaw, no. 201.

Woods, Thomas S.

2077. The porphyry intrusions of the Michigan copper district: *Eng. and Min. Jour.*, vol. 107, pp. 299-302, 3 figs., February 15, 1919.

Woodworth, J. B.

2078. Relations of fault-block mountains to folded chains (abstract with discussion by W. H. Hobbs and W. M. Davis): *Geol. Soc. America, Bull.*, vol. 31, no. 1, pp. 115-116, March 31, 1920.

See also Brown, no. 205.

Woolard, Edgar W.

2079. The Virginia earthquake of September 5, 1919: *Monthly Weather Review*, vol. 47, p. 839, November, 1919.

Wortman, Jacob L.

2080. On some hitherto unrecognized reptilian characters in the skull of the Insectivora and other mammals: *U. S. Nat. Mus., Proc.*, vol. 57, pp. 1-52, 16 figs., 1920.

Wrather, W. E. See Brokaw, no. 201.

Wright, Clarence A.

- (with Varley, Thomas, and others). A preliminary report on the mining districts of Idaho: *U. S. Bur. Mines, Bull.* 166, pp. 1-89, 2 pls. (maps), 1919.

Wright, Floyd E.

2081. Oil and gas [in Indiana]: *Indiana, Dept. Geology and Nat. Res., 41st Ann. Rept.*, pp. 114-121, 2 maps, 1917.

2082. Report of the State supervisor of natural gas: *Indiana, Year Book* 1918, pp. 207-212, 1919.

Wright, Fred E.

2083. Polarized light in the study of ores and metals: *Am. Philos. Soc., Proc.*, vol. 58, no. 7, pp. 401-447, 12 figs., 1919.

Wright, Fred E.—Continued.

2084. Examination of ores and metals in polarized light: Mining and Metallurgy, no. 158, sec. 1, pp. 44-45 (abstract), sec. 9, 12 pp., 3 figs., February, 1920; Am. Inst. Min. and Met., Trans., vol. 63, pp. 370-381, 3 figs., 1920.

2085. Experimental studies of the formation of jointing planes (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 120, March 31, 1920.

2086. Experiments illustrating development of igneous rock textures (abstract): Geol. Soc. America, Bull., vol. 31, no. 1, p. 141, March 31, 1920.

See also Smith, no. 1676.

Wright, G. Frederick.

2087. Charles Conrad Abbott and Ernest Volk [human remains in Trenton, New Jersey, grayels]: Science, new ser., vol. 50, pp. 451-453, November 14, 1919.

2088. The ice age in North America. Sixth enlarged edition, supplementary chapter [preface]. 24 pp., 1 fig., Bibliotheca Sacra Company, Oberlin, Ohio [1920?].

Wright, W. J.

2089. Investigations in New Brunswick and Nova Scotia: Canada, Geol. Survey, Summ. Rept., 1919, pt. F, pp. 1-2, 1920.

Wuensch, C. Erb.

2090. Statistical treatise on gold and silver: Colorado School of Mines Mag., vol. 9, no. 5, pp. 109-113, May, 1919.

Wyckoff, Ralph W. G.

2091. The crystal structures of some carbonates of the calcite group: Am. Jour. Sci., 4th ser., vol. 50, pp. 817-860, 18 figs., November, 1920.

Wyman, L. E.

2092. Notes on the Pleistocene fossils obtained from Rancho La Brea asphalt pits: Los Angeles County Museum of History, Science, and Art, Dept. Natural Sciences, Misc. Pub. no. 2, 35 pp., 22 figs., May, 1918.

Yale, Charles G.

2093. Gold, silver, copper, lead, and zinc in California and Oregon in 1917: U. S. Geol. Survey, Mineral Resources, 1917, pt. 1, pp. 203-252, February 18, 1919.

2094. (and Stone, Ralph W.). Magnesite in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 2, pp. 141-158, September 16, 1919.

2095. Gold, silver, copper, lead, and zinc in California and Oregon in 1918: U. S. Geol. Survey, Mineral Resources, 1918, pt. 1, pp. 405-459, February 24, 1920.

Yermoloff, Nicholas.

2096. The diatomaceous earth of Lompoc, Santa Barbara County, California: Geol. Mag., vol. 57, pp. 271-277, June, 1920.

Young, G. A.

2097. Burnthill Brook map area. New Brunswick: Canada Geol. Survey, Summ. Rept., 1917, pt. F, pp. 1-15, 1 pl., 1 fig. (maps), 1918.

Young, George J.

2098. Divide silver-gold district of Nevada: Eng. and Min. Jour., vol. 109, pp. 62-66, 7 figs., January 10, 1920.

Young, Jacob W.

2099. The halogen salts of silver at Wonder, Nevada: Econ. Geology, vol. 14, no. 5, pp. 427-430, August, 1919.

2100. The formation of the Sevier Valley in Utah: Eng. and Min. Jour., vol. 110, no. 17, p. 803, October 23, 1920.

Zapffe, Carl. See Allen, R. C., no. 25.

Ziegler, Victor.

2101. Popular oil geology. 2d ed., 171 pp., 62 figs., New York, John Wiley & Sons, 1920.

2102. Geologic and economic features of oil structures: Econ. Geology, vol. 15, no. 3, pp. 247-258, April-May, 1920.

Zubiría y Campa, Luis.

2103. La minería en el Estado de Durango [México]: Soc. cient. "Antonio Alzate," Mem. y Rev., t. 38, no. 3-4, pp. 177-198, map, March, 1919.

Anonymous.

2104. Eminent living geologists; Charles Doolittle Walcott: Geol. Mag., new ser., dec. 6, vol. 6, pp. 1-10, port., January, 1919.

2105. Mining copper at Kennecott, Alaska: Min. and Sci. Press, vol. 118, pp. 53-56, 3 figs., January 11, 1919.

2106. Geology of Montreal River district of northern Ontario: Eng. and Min. Jour., vol. 107, pp. 575-576, March 29, 1919.

2107. The deepest well: Min. and Sci. Press, vol. 119, pp. 341-342, September 6, 1919.

2108. The Knee Lake district in northern Manitoba: Min. and Sci. Press, vol. 121, pp. 306-307, 1 fig., August 28, 1920.

INDEX.

(The numbers refer to entries in the bibliography.)

- Abajo Mountains, Utah, structural features: Thorpe, 1841.
- Abitibi-Night Hawk gold area, Timiskaming district, Ontario: Knight, 1015.
- Abrasive materials: Katz, 959.
- Garnet, North Carolina: Katz, 957.
- Abstraction of potassium during sedimentation: Watson, 1959.
- Acadia, paleogeography: Bailey, 53.
- Addresses.
- Earth genesis: Chamberlin, 316.
- Earth sciences as the background of history: Merriam, 1266.
- Geology in the world war and after: Cross, 423.
- Great fossil reptiles of Alberta: Parks, 1450.
- Land and sea oscillations, major causes: Ulrich, 1891.
- National geological survey, functions and ideals: Ransome, 1510.
- Military contribution of civilian engineers: Smith, 1718.
- Place of paleontology among the sciences: Clarke, 353.
- Present tendencies in paleontology: Berry, 134.
- R  n   Just Haug: Whitlock, 2011.
- Sources and tendencies in American geology: Barrell, 70.
- Adirondacks: Alling, 26.
- Agricultural geology: Smith, 1726.
- Ainsworth district, British Columbia: Schofield, 1619.
- Alabama.
- Economic geology.*
- Clay County: Prouty, 1500.
- Graphite: Brumell, 213; Prouty, 1499.
- Mineral production, 1920: Jones, 952.
- Oil to carbon ratio: Lloyd, 1113.
- Petroleum possibilities, Coastal Plain area: Brantley, 191; northern Alabama: Semmes, 1656, 1657.
- Resources, southern Alabama: Harper, 750.
- Historical geology.*
- Clay County: Prouty, 1500.
- Coastal Plain area: Brantley, 191.
- Cretaceous: Berry, 129.
- Crystalline and semicrystalline rocks, age: Prouty, 1498.
- Geologic map: Smith, 1713.
- Northern Alabama: Semmes, 1656, 1657.
- Paleontology.*
- Cretaceous floras: Berry, 129.
- Hymenaea, Fayette County: Berry, 130.
- Physiographic geology.*
- Pleistocene penplain in Coastal Plain: Cleland, 365.
- Alamosa Creek valley, Socorro County, New Mexico: Winchester, 2061.
- Alaska.
- Areas described.*
- Canning River region, northern Alaska: Leffingwell, 1074.
- Chichagof Island, west coast: Overbeck, 1411.
- Chukotka region: Capps, 294.
- Jack Bay district, Prince William Sound: Johnson, 930.
- Kahiltna Valley: Mertie, 1282.
- Kantishna region: Capps, 291.
- Kiwalik-Koyuk region: Harrington, 751.
- Kodiak Island: Maddren, 1198.
- Porcupine district: Eakin, 530.
- Talkeetna Mountains, western: Capps, 293.
- Toistol district: Harrington, 752.

Alaska—Continued.

Economic geology.

- Anvik-Andreafski region: Harrington, 751.
 Chichagof Island, west coast: Overbeck, 1411.
 Chistochina region: Chapin, 330.
 Chulitna region: Capps, 294.
 Chromite deposits: Diller, 500; Mertie, 1283; Kenai Peninsula: Gill, 652.
 Coal, Matanuska field: Chapin, 335.
 Nenana field: Martin, 1217.
 Copper, Kennecott: Bateman, 98; Anon., 2105.
 Fairbanks district: Chapin, 331.
 Gold, Anvik-Andreafski region: Harrington, 751.
 Chichagof Island: Overbeck, 1411.
 Porcupine district: Eakin, 530.
 Silver, copper, and lead: Martin, 1220.
 Tolovana district: Overbeck, 1413.
 Gypsum: Stone, 1785.
 Hot Springs district: Chapin, 333.
 Jack Bay district, Prince William Sound: Johnson, 930.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kenai Peninsula: Johnson, 931.
 Kennecott copper deposits: Bateman, 98, 99.
 Kiwalik-Koyuk region, gold and platinum placers: Harrington, 755.
 Kodiak Island, beach placers: Maddren, 1198.
 Marble resources, southeastern Alaska: Burchard, 236.
 Matanuska coal fields: Martin, 1219.
 Mining industry: Martin, 1218, 1223.
 Molybdenite, Healy River: Chapin, 332.
 Nenana coal field: Martin, 1217.
 Nickel, Copper River valley: Overbeck, 1412.
 Northwestern Alaska: Cathcart, 305.
 Palladium, Prince of Wales Island: Campbell, 278.
 Porcupine district: Eakin, 530.
 Prince William Sound: Johnson, 929.
 Ruby district, tin: Chapin, 334.
 Salt-Chuck palladium-copper mine, Prince of Wales Island: Mertie, 1284.
 Seward Peninsula, graphite: Harrington, 754; tin: Harrington, 753.
 Talkeetna Mountains, western: Capps, 293.
 Tin, Lost River district: Fearing, 577.
 Tolstoi district: Harrington, 752.
 Unalaska and Akun islands, sulphur: Maddren, 1197.
 Willow Creek district, gold lode mining: Capps, 292; Chapin, 336.

Historical geology.

- Anvik-Andreafski region: Harrington, 751.
 Canning River region, northern Alaska: Leffingwell, 1074.
 Chistochina region: Chapin, 330.
 Glaciation, Paleozoic, southeastern Alaska: Kirk, 1011.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kennecott: Bateman, 98.
 Kiwalik-Koyuk region: Harrington, 755.
 Kodiak Island: Maddren, 1198.
 Matanuska coal fields: Martin, 1219.
 Paleoclimatology: Blackwelder, 151.
 Pliocene: Dall, 451.
 Porcupine district: Eakin, 530.
 Pribilof Islands: Hanna, 741.
 Tolstoi district: Harrington, 752.

Paleontology.

- Pliocene and Pleistocene: Dall, 451.
 Pribilof Islands: Hanna, 741.
 Tertiary, Pribilof Islands: Dall, 450.

Physical geology.

- Bogoslof Islands: Friedlaender, 624.
 Glacial erosion: Crosby, 420.
 Glacier studies: Chamberlin, 315.

Alaska—Continued.

Physical geology—Continued.

- Katmai region: Fenner, 578.
- Katmai Volcano: Griggs, 712; eruption: Fenner, 579; Griggs, 711.
- Klutian Glacier: Lambart, 1048.
- Mageik landslide, Katmai district: Griggs, 713.
- Valley of Ten Thousand Smokes: Shipley, 1694; temperature inversions in fumaroles: Sosman, 1740.
- Volcanic emanations and incrustations: Shipley, 1795.

Physiographic geology.

- Canning River region, northern Alaska: Leffingwell, 1074.
- Katmai region: Fenner, 579.
- Stream piracy, Tolovana and Hess River basins: Mertie, 1281.

Alberta.

Areas described.

- Little Smoky River: McLearn, 1190.

Economic geology.

- Bituminous sands, northern Alberta: Ells, 547.
- Coal, Brule Lake region: MacVicar, 1196.
- Highwood area: Rose, 1576.
- Gas and oil fields: Dowling, 514.
- Natural gas: Dowling, 516.
- Mineral resources: Allan, 19.
- Oil possibilities, Great Plains: Dowling, 517.
- Peace River oil: Rutledge, 1590.
- Petroleum, occurrence: Coste, 411; Dowling, 518; western Alberta: Purdy, 1501.

Historical geology.

- Borings: Dowling, 515.
- Brule Lake region: MacVicar, 1196.
- Cordillera: Burwash, 249.
- Correlation: Dowling, 514.
- Cretaceous, lower Smoky River: McLearn, 1187.
- Peace and Athabaska valleys: McLearn, 1188.
- Crownest coal field, northern part: Rose, 1575.
- Devonian, central basin: Dowling, 517.
- Glacier Lake section: Walcott, 1928.
- Highwood coal area: Rose, 1576.
- Jasper Park region: Keyes, 985.
- Southern and central Alberta: Slipper, 1712.
- Southwestern Alberta: Stewart, 1766.
- Swan Hills, Lesser Slave Lake district: Allan, 20.
- Western Alberta: Purdy, 1501.

Paleontology.

- Edmontosaurus: Lambe, 1049.
- Dinosaurs: Matthew, 1246; Belly River beds: Lambe, 1050; Parks, 1451.
- Kritosaurus, Belly River formation: Parks, 1452.
- Pelecypoda, Cretaceous: McLearn, 1189, 1191.
- Reptilia: Parks, 1450.

Physical geology.

- Southwestern Alberta: Stewart, 1766.

Physiographic geology.

- Lake Athabasca, origin: Alcock, 15.
- Southwestern Alberta: Stewart, 1766.

Algae.

- Middle Cambrian: Walcott, 1931.
- Pre-Cambrian and Carboniferous: Twenhofel, 1869.
- West Indies, Tertiary calcareous: Howe, 922.

Algonkian. *See* Pre-Cambrian.

Alidade, telescopic, manipulation: Mather, 1225.

Alkali.

- Nebraska: Barbour, 67.

Alpine structures, Jasper Park, Alberta: Keyes, 985.

Aluminum: Hill, 825, 826.

Amber, origin: Black, 150.

Ammonites. *See* Cephalopoda.

Amphicoelias: Osborn, 1406.

150 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

Amphibia.

Labyrinthodont thoracic shield: Case, 302.

Wyoming, Lysite beds, Ototriton: Loomis, 1122.

Anguilla.

Paleontology.

Tertiary calcareous Algae: Howe, 872.

Anthozoa.

Cannonball fauna: Vaughan, 1916.

Heterolasma, Silurian, Michigan: Ehlers, 540.

West Indies: Vaughan, 1909.

Antigua.

Geology: Thomas, 1831.

Paleontology.

Tertiary calcareous Algae: Howe, 872.

Petrology.

Rhyolitic pebbles: Harrison, 760.

Antillean fauna, origin: Matthew, 1239.

Antimony: Bastin, 94.

Idaho: Thomson, 1839; Pine Creek district: Jones, 944.

Anvik-Andreafski region, Alaska: Harrington, 751.

Appalachian oil and gas fields, geology: Mills, 1313.

Appalachian oil field: Reeder & Company, 1524.

Arachnida.

Eurypterid horizon, New York: Chadwick, 307.

Aragonite deposited from sea water: Wells, 1982.

Arctic regions.

Historical geology.

Ellesmere Land: Holtdahl, 850.

Argonaut gold mine, Ontario: Knight, 1020.

Arizona.

United State Geological Survey publications relating to Arizona: Jenkins, 900.

Areas described.

Jerome district, Yavapai County: Reber, 1522.

Ray-Miami region: Ransome, 1507.

San Carlos Indian Reservation: Schwennessen, 1640.

Economic geology.

Amole district: Allen, 23.

Barytes: Allen, 22.

Cave Creek district: Lewis, 1095.

Copper: Tovote, 1855.

Jerome district: Mitchell, 1325; Rice, 1542.

Ray-Miami region: Ransome, 1507.

Copper ore minerals, vertical distribution in Junction mine, Warren district: Mitchell, 1323.

Copper schist deposits: Crampton, 414.

Field tests for common metals: Fansett, 569.

Gold, silver, copper, lead, and zinc: Heikes, 784, 786.

Gypsum: Stone, 1785.

Iron ore, magmatic, Eureka district: Ball, 60.

Jerome district, Yavapai County: Reber, 1522.

Manganese: Jones, 946; Colorado River desert region: Jones, 949.

Ore deposits: Tovote, 1856; age and classification: Wilson, 2055.

Salt deposits: Phalen, 1469.

Tucson and Amole Mountains: Jenkins, 901.

Warren district: Mitchell, 1322.

Historical geology.

Bright Angel quadrangle, geologic history: Noble, 1376.

Cave Creek district: Lewis, 1095.

Gila region: Ross, 1579.

Papago country, southwestern Arizona: Bryan, 218.

Permo-Triassic, northwestern Arizona: Shimer, 1693.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Ray-Miami region: Ransome, 1507.

Tucson and Amole Mountains: Jenkins, 901.

Warren district: Mitchell, 1322.

Arizona—Continued.

Mineralogy.

- Flagstaffite: Guild, 722.
- Higginsite, Bisbee: Palache, 1423.
- Ray-Miami region: Ransome, 1507.
- Yuma County: Foshag, 612.

Petrology.

- Jerome ores: Rice, 1542.

Physiographic geology.

- Grand Canyon district: Noble, 1376.
- Meteor Mountain: Boot, 168.
- Papago country, southwestern Arizona: Bryan, 218.
- Rock tanks and charcos, origin: Bryan, 215.
- San Carlos Indian Reservation: Schwennesen, 1640.

Underground water.

- San Carlos Indian Reservation: Schwennesen, 1640.

Arkansas.

- Geological surveys: Branner, 188.

Economic geology.

- General: Ferguson, 582.
- Gypsum: Stone, 1785.
- Manganese: Stose, 1792; Batesville district: Miser, 1316, 1320.
- Mineral resources: Ferguson, 582.
- Road-making materials: Branner, 189.

Historical geology.

- General: Ferguson, 582; Miser, 1319.
- Mississippian tuff, Ouachita Mountains: Miser, 1318.

Mineralogy.

- Hausmannite, Batesville district: Miser, 1317.

- Arsenic: Hill, 820, 824.

- Artesian waters and wells. *See* Underground water.

Arthropoda.

- Phylogeny: Raymond, 1519.

- Asbestos: Diller, 502.

- Quebec: Lynch, 1151.

- Asphalt: Osbon, 1401.

- Bibliography: Osbon, 1401.

Associations, meetings.

- American Association for the Advancement of Science, Section E, St. Louis meeting, 1919: Chamberlin, 314.

- Geological Society of America, 31st annual meeting, Baltimore: Hovey, 869; 32d annual meeting, Boston: Hovey, 870.

- Cordilleran section, meetings: Taff, 1809, 1810, 1811; nineteenth meeting: Louderback, 1127.

- Mineralogical Society of America, organization: Rogers, 1564; Whitlock, 2015.

- Paleontological Society, Baltimore meeting, 1918: Bassler, 91; eleventh annual meeting, Boston: Bassler, 92.

- Pacific coast section, ninth meeting: Stock, 1769.

- State Geologists, Alabama meeting: Watson, 1964.

- Athabaska series: Alcock, 14.

- Athapapuskow Lake district, Manitoba: Bruce, 207.

- Atikokania: Rothpletz, 1582.

- Aulacera: Schuchert, 1626.

- Aves: Ballou, 63.

- Bacteria, iron-depositing: Harder, 745.

- Banded clays: Sayles, 1606.

Barbados.

Petrology.

- Coral limestones, minerals in: Harrison, 758.

Physical geology.

- Soils, genesis: Harrison, 759.

- Barite: Allen, 22; Stose, 1791.

- Arizona: Allen, 22.

- Georgia: Hull, 880.

- Magmatic origin: Lewis, 1097.

- Missouri: Tarr, 1817.

- Tennessee, eastern: Gordon, 674.



152 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

- Barkley Sound, Vancouver Island, British Columbia: Dolmage, 506.
 Barometric surveying in petroleum mapping: Lahee 1045.
 Barosaurus: Lull, 1145.
 Barytes. *See* Barite.
 Batesville district, Arkansas: Miser, 1320.
 Bathyliths. *See* Intrusions.
 Batrachia. *See* Amphibia.
 Bauxite: Hill, 825, 826.
 Beaches. *See also* Shore lines; Terraces.
 Alaska: Dall, 451.
 Illinois, Chicago area: Salisbury, 1594.
 Beatrice: Schuchert, 1626.
 Belcher Islands, Hudson Bay, iron deposits: Moore, 1341.
 Belt fauna: Rothpletz, 1581.
 Belt formation, Helena, Montana: Rothpletz, 1581.
 Bend formation, Texas: Girty, 659.
 Ben Nevis gold area, Ontario: Knight, 1019.
 Beryl crystal, Black Hills: Waldschmidt, 1933.
 Blinohelmitite as an ore mineral: Shannon, 1668.
 Bibliography.
 Arizona: Jenkins, 900; Ray-Miami region: Ransome, 1507.
 Asphalt: Osbon, 1401.
 Barrell, Joseph, writings: Schuchert, 1631.
 Becker, G. F., writings: Day, 478.
 Black Hills region: O'Harra, 1889.
 Broadhead, G. C., writings: Keyes, 986.
 Canada, Geological Survey publications: Ferrier, 587.
 Coal, Kentucky: Jillson, 915.
 Colorado, north central, foothills formation: Henderson, 795.
 northeastern, Cretaceous: Henderson, 794.
 western, mineral deposits: Auran, 49.
 Crinoidea Flexibilia: Springer, 1748.
 Cuba, carbonaceous materials: Ortega, 1398.
 Eastman, C. R., writings: Dean, 480.
 Florida: Sellards, 1647; human remains: Sellards, 1645.
 Fluorspar deposits: Auran, 48.
 Gilbert, G. K., writings: Mendenhall, 1262.
 Glass sands: Richardson, 1547.
 Greenland: Bøggild, 157.
 Gypsum: Stone, 1785.
 Hitchcock, C. H., writings: Upham, 1896.
 Human remains, Vero, Florida: Sellards, 1645.
 Iron depositing bacteria: Harder, 745.
 Irving, J. D., writings: Kemp, 970.
 Jillson, W. D., writings: Jillson, 923.
 Julien, A. A., writings: Kemp, 974.
 Kentucky: Miller, 1293; coal: Jillson, 916, 922; petroleum, natural gas, asphalt, and oil shale: Jillson, 909, 922.
 Lambe, L. M., writings: Kindle, 1009.
 Manganese: Harder, 746; Hewett, 810; Mullenburg, 1355; Wheeler, 1988.
 Maryland, Cambrian and Ordovician: Bassler, 90.
 Mell, P. H., writings: Calhoun, 273.
 Mesozoic and Cenozoic plants, catalog: Knowlton, 1027.
 Mineral supplies, United States: McCaskey, 1160.
 Minnesota: Gregory, 710.
 Moses, A. J., writings: Luquer, 1150.
 Oil shales: Alderson, 16.
 Oregon: Smith, 1728.
 Petroleum: Burroughs, 241, 242.
 Platinum group of metals: Howe, 871.
 Pleistocene life: Baker, 56.
 Postglacial uplift of southern New England: Fairchild, 562.
 Potash: Gale, 631; Hicks, 817, 818.
 Pre-Cambrian, northern Quebec: Cooke, 403.
 Pre-Cambrian literature: Steidtmann, 1760.
 Purdue, A. H., writings: Ashley, 45.



Bibliography—Continued.

- Quicksilver: Evans, 554, 555.
 Ripple mark: Bucher, 222.
 Rogers, G. S., writings: Kemp, 975.
 Salt: Phalen, 1469.
 Seismology, Mexico: Muñoz Lumbier, 1359.
 Texas, Fredericksburg and Washita formations: Adkins, 7.
 Weno and Pawpaw formations: Adkins, 6.
 Trilobites: Raymond, 1520.
 Tungsten, United States: Hess, 800.
 U. S. Geological Survey: Inst. Govt. Research, 891.
 Utah, ore deposits: Butler, 255.
 Van Hise, C. R., writings: Leith, 1080.
 Walcott, C. D., writings: Anon., 2104.
 Washington, mineral resources: Fischer, 596.
 Stevens County: Weaver, 1970.
 Williams, H. S., writings: Cleland, 361.

Biography.

- Barrell, Joseph: Schuchert, 1629, 1630, 1631; Willis, 2046.
 Becker, G. F.: Day, 477, 478.
 Billings, W. R.: Kindle, 1010.
 Broadhead, G. C.: Keyes, 986.
 Clark, W. B.: Emerson, 548.
 Eastman, C. R.: Dean, 479, 480; Holland, 848.
 Gilbert, G. K.: Andrews, 31; Barrell, 69; Fairchild, 559; Mendenhall, 1262;
 Merriam, 1263.
 Hall, James: Clarke, 359.
 Häüy, R. J.: Whitlock, 2011.
 Hidden, W. E.: Kunz, 1039.
 Hitchcock, C. H.: Upham, 1896.
 Howell, E. E.: Fairchild, 560.
 Iddings, J. P.: Merrill, 1278.
 Irving, J. D.: Kemp, 970.
 Julien, A. A.: Kemp, 974.
 Lambe, L. M.: Kindle, 1003, 1009.
 Lucas, A. F.: McBeth, 1154.
 Mell, P. H.: Calhoun, 273.
 Merriam, J. C.: Matthew, 1244.
 Miller, W. G.: Rickard, 1550.
 Moses, A. J.: Kunz, 1040; Luquer, 1150; Whitlock, 2018, 2019.
 Pirsson, L. V.: Cross, 424; Iddings, 887.
 Powell, J. W., memorial: Dellenbaugh, 487.
 Purdue, A. H.: Ashley, 45.
 Raymond, R. W.: Ingalls, 889; Rickard, 1552.
 Rogers, G. S.: Kemp, 975.
 Van Hise, C. R.: Leith, 1080; Wolff, 2073.
 Walcott, C. D.: Anon., 2104.
 Ward, H. A.: Fairchild, 558.
 Williams, H. S.: Cleland, 361; Gregory, 700.
 Williston, S. W.: Lull, 1144; Osborn, 1402, 1403; Shimer, 1692.
 Winchell, H. V.: Rickard, 1549.

Bismuth: Hill, 820, 824.

Bituminous sands.

Alberta, northern: Ellis, 547.

Blastoidea.

Chester fauna: Weller, 1973.

Borings.

- Alabama, Coastal Plain: Brantley, 191.
 northern: Semmes, 1656, 1657.
 California, San Diego County: Ellis, 542.
 Canada, Prairie provinces: Dowling, 515.
 Deep wells: Anon., 2107.
 Examination of well cuttings: Trager, 1858.
 Illinois, Colchester and Macomb quadrangles: Hinds, 832.
 Goodhope and La Harpe quadrangles: Nebel, 1368.
 northeastern: Anderson, 30.

Borings—Continued.

- Indiana: Logan, 1120.
 Iowa, Atlantic: Tilton, 1847.
 Pocahontas County, Laurens: Cable, 264.
 Kansas, Syracuse and Lakin quadrangles: Darton, 462.
 Kentucky: Jillson, 903, 922; Shaw, 1680.
 Allen County: Jillson, 913.
 Breathitt and Knox counties: Jillson, 914.
 eastern: Jillson, 917, 918.
 southeastern: Jillson, 910.
 Stinking Creek region: Jillson, 904.
 Warren County: Jillson, 919; Laird, 1047.
 Logmeter: Burton, 247.
 Mississippi: Lowe, 1139.
 Montana, Glendive: Bowen, 171.
 Vananda: Bowen, 171.
 Nevada, Steptoe Valley: Clark, 347.
 New Mexico: Ellis, 545.
 Oklahoma: Bloesch, 155; Shaw, 1685.
 Ontario, southwestern: Williams, 2038.
 Tennessee, Sumner County: Mather, 1227.
 Texas, Amarillo region: Gould, 678.
 Bexar County: Sellards, 1653.
 Brown County: Waite, 1924.
 central: Matteson, 1231.
 Tarrant County: Winton, 2062.
 West Point salt dome: De Golyer, 485.
 United States: Phalen, 1469.
 Virginia, Tazewell County: Harnsberger, 749.
 West Virginia, Marion County, deepest well: White, 2006.
 Wyoming, Cambria: Hancock, 736.
 Lance Creek field: Hancock, 737.
 Rock Springs area, Sweetwater County: Schultz, 1639.
 Upton-Thornton oil field: Hancock, 735.
 Botany, fossil. *See* Paleobotany.
 Boulders.
 Iowa, Kansan drift: Kay, 962.
 Kansas, southeastern, granite boulders: Twenhofel, 1868.
 Boyer Valley, Iowa: Lees, 1070.
 Brachiopoda.
 Derbya: Price, 1492.
 Etheridgina: Greger, 699.
 Platystrophia: McEwan, 1173.
 Pocono fauna: Price, 1493.
 Syringothyris: North, 1377.
 Breccia.
 Iowa, Wapsipinicon breccias: Norton, 1381.
 New York, Rochester: Giles, 651.
 British Columbia.
 Areas described.
 Ainsworth district: Schofield, 1619.
 Barkley Sound, Vancouver Island: Dolmage, 506.
 Britannia area: Schofield, 1616.
 Cariboo district: MacKay, 1179.
 Coquihalla area: Camsell, 286.
 Copper Mountain, Gun Creek: Camsell, 284.
 Hazleton district: O'Neill, 1390.
 Lillooet-Prince George region: Reinecke, 1538.
 Quatsino Sound district, Vancouver Island: Dolmage, 505.
 Salmon River district: O'Neill, 1393.
 Sloean area: Bancroft, 66.
 Sunloch copper district, Vancouver Island: Dolmage, 507.
 Economic geology.
 Alice Arm district: Davis, 467.
 Cariboo gold fields: MacKay, 1177, 1178.
 Clinton district: Reinecke, 1537.
 Copper, Hidden Creek mine: Campbell, 280.

British Columbia—Continued.

Economic geology—Continued.

- Copper sulphides, La Fleur Mountain: McLaughlin, 1183.
 Crowsnest Pass coal field: Strachan, 1796.
 Gold: Camsell, 288; Coquihalla area: Camsell, 286.
 Granby mines, Phoenix: Campbell, 277.
 Hazelton district: O'Neill, 1390.
 Hidden Creek mine, Granby Bay: Campbell, 280.
 Kamloops Lake, mercury deposits: Camsell, 282.
 Lardeau area: Bancroft, 65.
 Lillooet-Prince George region: Reinecke, 1538.
 Mesozoic mineralization: Schofield, 1688.
 Mining industry, 1918, 1919: Robertson, 1557, 1558.
 Oil and gas possibilities, northeastern British Columbia: Stewart, 1767.
 Oil possibilities, Vancouver region: Camsell, 283.
 Placer mines, Cariboo district: Tyrrell, 1876.
 Platinum: Camsell, 285; Uglow, 1889; Tulameen district: Macaulay, 1153.
 Quatsino Sound district, Vancouver Island: Dolmage, 505.
 Salmon River district: Prior, 1496.
 Silver, Stump Lake: Camsell, 287.
 Silver-lead deposits, Ainsworth district: Schofield, 1619.
 Stewart district: Campbell, 279; silver ores: Dolmage, 508.
 Sunloch copper district, Vancouver Island: Dolmage, 507.
 Taseko Valley iron deposits: Brewer, 194.

Historical geology.

- Ainsworth district: Schofield, 1617.
 Copper Mountain, Gun Creek: Camsell, 284.
 Cordillera: Burwash, 249.
 Mesozoic: Schofield, 1618; Hedley: Schofield, 1620.
 Northeastern British Columbia: Stewart, 1767.
 Tulameen district: Macaulay, 1153.
 Vancouver region: Camsell, 283.

Mineralogy.

- Axinite, Nickel Plate Mountain: Poitevin, 1479.
 Calamine, Ainsworth: Poitevin, 1478.
 Cerusite, Moyie: Poitevin, 1480.
 Ferrierite, Kamloops Lake: Graham, 692.
 H. P. mine, Salmo: Walker, 1936.

Paleontology.

- Algae, Middle Cambrian: Walcott, 1931.
 Spongiae, Middle Cambrian: Walcott, 1932.

Petrology.

- Gabbros, East Sooke and Rocky Point, Vancouver Island: Cooke, 402.

Physical geology.

- Earthquake, December 6, 1918: Denison, 493.
 Glaciation: Tyrrell, 1875.
 Yoho Glacier, movement, 1917-19: Wheeler, 1987.

Physiographic geology.

- Purell trench: Schofield, 1621.

Bromine: Stone, 1779.

Bryozoa.

Tertiary: Canu, 290.

West Indies: Canu, 289.

Building Stone. *See* Granite; Limestone; Sandstone; Stone.

Burnthill Brook area, New Brunswick: Young, 2097.

Butler salt dome, Texas: Powers, 1484.

Cadmium: Siebenthal, 1697, 1698, 1702.

Calcination volcanoes: Hobbs, 835.

Calcium chloride: Stone, 1779.

California.

Areas described.

- Lanfair Valley, San Bernardino County: Thompson, 1837.
 San Diego County, western part: Ellis, 542.
 Santa Ynez River district, Santa Barbara County: Kew, 980.
 Simi Valley, southern California: Kew, 979.
 Sunset-Midway oil field: Pack, 1415.

California—Continued.

Economic geology.

- Chromite deposits: Diller, 500.
 Clay: Boalich, 156.
 Economic minerals: Castello, 304.
 Gold, silver, copper, lead, and zinc: Yale, 2093, 2095.
 Gypsum: Stone, 1785.
 Kelly silver mine, Randsburg, Kern County: Carpenter, 297.
 Magnesite: Phalen, 1470.
 Manganese, southeastern California: Jones, 947.
 Mineral production, 1918, 1919: Bradley, 186, 187.
 Nevada County: Mac Boyle, 1156.
 Oil, gas, and water, relations in Sunset-Midway field: Rogers, 1566.
 Oil-field waters: Rogers, 1567.
 Petroleum: McLaughlin, 1185.
 Santa Clara Valley: Reinhard, 1539.
 Simi Valley: Kew, 979.
 Sunset-Midway oil field: Pack, 1415.
 Platinum and allied metals: Logan, 1115.
 Plumas County: Mac Boyle, 1157.
 Salt deposits: Phalen, 1469.
 Sierra County: Mac Boyle, 1158.
 Sunset-Midway oil field: Pack, 1415.
 Vein crossings, Grass Valley: Hoover, 853.

Historical geology.

- Eocene divisions: Clark, 341.
 Meganos group: Clark, 342.
 Miocene, Santa Barbara County: Jordan, 956.
 Mohave Desert: Merriam, 1264.
 Nevada County: Mac Boyle, 1156.
 Plumas County: Mac Boyle, 1157.
 Santa Clara Valley: Reinhard, 1539.
 Santa Ynez River district, Santa Barbara County: Kew, 980.
 Sierra County: Mac Boyle, 1158.
 Sunset-Midway oil field: Pack, 1415.

Mineralogy.

- Apthitalite, Searles Lake: Foshag, 616.
 Boussingaultite, South Mountain, Santa Paula: Larsen, 1058.
 Chlorite, chromiferous: Shannon, 1675.
 Colemanite pseudomorphous after inyoite, Death Valley: Rogers, 1562.
 Economic minerals: Castello, 304.
 Manganese minerals, San Jose: Rogers, 1563.
 Minerals in limestone formed by contact metamorphism, Crestmore, Riverside County: Eakle, 531.
 Plazolite, Riverside: Foshag, 619.
 Sulphohalite, Searles Lake: Foshag, 615.
 Thumasite and spurrite, Crestmore: Foshag, 617.
 Vonsenite, Riverside: Eakle, 532.

Paleontology.

- Diatomaceae, Lompoc, Santa Barbara County: Yermoloff, 2096.
 Echinoidea: Kew, 981.
 Mohave Desert: Merriam, 1264.
 Mylodon harlani, mounted skeleton: Stock, 1772.
 Pisces, Lompoc: Jordan, 955; southern California: Jordan, 954.
 Rancho La Brea fossils, Los Angeles County: Wyman, 2092.
 Tertiary and Quaternary faunas: Smith, 1724.
 Tertiary vertebrate fauna, southern coast ranges: Stock, 1770.
 Xyne grex, Santa Barbara County: Jordan, 957.

Physical geology.

- Coast ranges, mobility: Lawson, 1062; structure: Willis, 2048.
 Earthquakes: Townley, 1857.
 Inglewood, June 21 1920: Taber, 1807.
 Los Angeles region: Arnold, 38.
 recent: Palmer, 1430.
 registration: Davis, 468-471; Bond, 165.
 San Jose: Vickery, 1918.
 southern California: Mulholland, 1358; Taber, 1808.
 1918, 1919: Palmer, 1428, 1429.

California—Continued.

Physical geology—Continued.

Fault system at southern end of Sierra Nevada: Buwalda, 260.

Rifts of southern California: Hill, 829.

San Francisco Bay sediments: Louderback, 1125.

Sierra Nevada, postglacial denudation: Muir, 1356.

Physiographic geology.

Cockscomb Crest, Yosemite: Matthes, 1233.

Rifts of southern California: Hill, 829.

Underground water.

Lanfair Valley, San Bernardino County: Thompson, 1837.

Oil-field waters: Rogers, 1597.

Pahrump, Mesquite, and Ivanpah valleys: Waring, 1952.

San Diego County, western part: Ellis, 542.

San Jacinto and Temecula basins: Waring, 1950.

Camarasaurus: Osborn, 1406, 1407.

Cambrian. *See also* Paleontology, Cambrian.

Acadia: Bailey, 53.

Alberta, Glacier Lake section: Walcott, 1928.

Arctic regions, Ellesmere Land: Høltedahl, 850.

Arizona, Ray-Miami region: Ransome, 1507.

Tucson and Amole Mountains: Jenkins, 901.

Arkansas: Miser, 1319.

Belt formation, Helena, Montana: Rothpletz, 1581.

Bibliographic studies: Resser, 1540.

Canadian Rockies: Burwash, 249.

Georgia: McCallie, 1159.

Greenland: Böggild, 157; northwestern: Koch, 1033.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

Maryland: Bassler, 90.

Minnesota: Grout, 715.

Montana, Fergus County: Freeman, 622.

Helena region: Rothpletz, 1581.

New Brunswick: Bailey, 52.

Newfoundland: Howell, 873.

New Mexico: Keyes, 993.

eastern: Baker, 55.

New York, Canton quadrangle: Chadwick, 310.

Lake Clear region: Alling, 26.

Quebec, Coleraine area: Knox, 1030.

Taconic system resurrected: Schuchert, 1625.

Texas: Udden, 1880.

Utah: Butler, 255.

Tintic district: Lindgren, 1105.

Vermont Green Mountains, western flank: Dale, 446.

Northfield: Richardson, 1545.

Roxbury: Richardson, 1546.

Virginia, Blue Ridge, west foot: Stose, 1786.

Wisconsin, Tomah-Sparta quadrangles: Twenhofel, 1870.

Camp Devens area, Massachusetts: Atwood, 46.

Camp Dodge region, Iowa: Lees, 1069.

Canada (general). *See also* names of provinces.

Mackenzie River basin: Camsell, 281.

Geological Survey, publications, catalog: Ferrier, 587.

Geological Survey, report: McInnes, 1175, 1176.

Economic geology.

Apatite: Spence, 1745.

Belcher Islands, Hudson Bay, iron deposits: Moore, 1841.

Coal: Gray, 693; western Canada: White, 2009.

Copper, Arctic Canada: O'Neill, 1392.

Graphite: Spence, 1744.

Helium in natural gases: McLennan, 1192.

Mackenzie River basin: Camsell, 281.

Manganese: Mackenzie, 1181.

Mines Branch, report: Haanel, 725, 726.

Oil, western provinces: Pearce, 1456.

Oil possibilities, western Canada: Dowling, 520.

Canada (general)—Continued.

Economic geology—Continued.

- Oil resources: Dowling, 519.
 Ore bodies, occurrence in pre-Cambrian: Dougherty, 512.
 Ore deposits of Arctic Canada: Moore, 1342.
 Phosphate: Spence, 1745.
 Platinum: Mackenzie, 1181; O'Neill, 1391.
 Salt: Cole, 377, 378.
 Titaniferous iron ores: Goodwin, 673.

Physiographic geology.

- Glaciers, Rocky Mountains: Wheeler, 1986.
 Relief map of Prairie provinces: Dowling, 1513.
 Rocky Mountain geosynclinal: Burwash, 250.
 Canal Zone. *See* Panama.
 Canning River region, northern Alaska: Leffingwell, 1074.
 Cannonball fauna: Stanton, 1756; corals: Vaughan, 1916.
 Carboniferous. *See also* Paleontology, Carboniferous.
 Acadia: Bailey, 53.
 Alabama: Prouty, 1498.
 northern: Semmes, 1656.
 Alaska, Anvik-Andreafski region: Harrington, 751.
 Canning River region: Leffingwell, 1074.
 Chistochina region: Chapin, 330.
 Porcupine district: Eakin, 530.
 Allegheny formation, typical section: Swartz, 1803.
 Arctic regions, Ellesmere Land: Holtehdahl, 850.
 Arizona, northwestern: Shimer, 1693.
 Ray-Miami region: Ransome, 1507.
 Arkansas: Miser, 1319.
 British Columbia, Ainsworth district: Schoneld, 1617, 1619.
 Lillooet-Prince George region: Reinecke, 1538.
 Selkirk Range: Schofield, 1621.
 Slocan area: Bancroft, 66.
 Chester series: Weller, 1974.
 Colorado, Montezuma County, McElmo anticline: Coffin, 375.
 north central, foothills formations: Henderson, 795.
 Routt and Moffat counties: Perini, 1461.
 Correlation, Texas-Kansas: Beede, 110.
 Dighton conglomerate, origin: Perkins, 1462.
 Georgia: McCallie, 1159.
 Greenland: Böggild, 157.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois, Brown County: Nebel, 1367.
 Chester series: Weller, 1974, 1975.
 Colchester and Macomb quadrangles: Hinds, 882.
 Goodhope and La Harpe quadrangles: Nebel, 1368.
 Hardin County: Weller, 1973.
 Hennepin quadrangle: Cady, 267.
 La Salle quadrangle: Cady, 267, 270.
 Pike and Adams counties: Coryell, 410.
 Saline and Gallatin counties: Cady, 268.
 Indiana, Greene County, eastern: Malott, 1205.
 Orange County, Chester formations: Hole, 847.
 southern, Chester series: Malott, 1206.
 Interior coal fields: Keyes, 983.
 Iowa, Adair County: Gow, 679.
 Cass County: Tilton, 1847.
 Clarke County: Tilton, 1846.
 Fort Dodge, Ste. Genevieve marls: Lees, 1073.
 Ringgold County: Arey, 35.
 southwestern: Smith, 1714.
 Taylor County: Arey, 36.
 Kansas: Moore, 1346, 1349.
 Snider, 1736.
 Allen and Neosho counties: Moore, 1347.
 eastern: Fath, 575.
 Elk City field: Boughton, 170.

Carboniferous—Continued.

Kansas—Continued.

Wilson and Montgomery counties: Moore, 1348.

Wreford and Foraker limestones: Twenhofel, 1867.

Kentucky: Jillson, 872; Miller, 1293.

Allen County: Miller, 1297; Shaw, 1680.

Barren County: Butts, 259.

Breathitt and Knox counties: Jillson, 864.

Johnson County, Paint Creek uplift: Rhodes, 1541.

Kendrick shale: Jillson, 9*1.

Magoffin County: Browning, 206.

southeastern: Jillson, 910.

Stinking Creek region: Jillson, 904.

Warren County: Jillson, 919.

Kinderhook group: Moore, 1343.

Louisian vs. Mississippian: Keyes, 989.

Maryland, coal measures: Swartz, 1804.

Mid-Continent fields: Snider, 1736.

Mississippi: Lowe, 1138.

Mississippian tuff, Ouachita Mountains: Miser, 1318.

Missouri: Branson, 190.

Montana, Fergus County: Freeman, 622.

Stanford hematite district: Westgate, 1985.

New Brunswick: Bailey, 52.

Burnthill Brook area: Young, 2097.

New Mexico: Keyes, 993.

Chaves County: Merritt, 1280.

eastern: Baker, 55.

Manzano group: Lee, 1068.

northeastern: Garrett, 640.

Pecos Valley: Semmes, 1658.

Puertecito district: Wells, 1978.

Taos Range: Gruner, 720.

Ohio, Dunkard series: Stauffer, 1757.

Muskingum County: Stout, 1794.

Oklahoma: Bloesch, 155; Greene, 695.

Caddo County: Clapp, 340.

Hogshooter gas sand: Berger, 123.

Osage Reservation: Bowen, 172; Goldman, 665, 666, 667; Heald, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross, 1578.

Wreford and Foraker limestones: Twenhofel, 1867.

Oregon: Smith, 1728.

Paleozoic, late: Case, 299.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Tennessee, Overton County: Butts, 258.

Rutherford County: Galloway, 633.

Sumner County: Mather, 1227.

Texas: Udden, 1880.

Amarillo region: Gould, 678.

Bend series: Girty, 659, 660; Moore, 1344.

central: Matteson, 1231.

Coke County red beds: Beede, 108, 109.

Crockett County: Liddle, 1102.

Diablo Plateau: Beede, 110.

Ellenburger formation: Sellards, 1652.

Hudspeth County: Beede, 111.

Marathon fold: Liddle, 1101.

north central: Udden, 1887; Pennsylvanian formations: Plummer, 1475.

northern: Pratt, 1489.

Ranger oil field: Eckes, 536.

Utah: Butler, 255.

Tintic district: Lindgren, 1105.

Virginia, Tazewell County: Harnsberger, 749.

West Virginia, Fayette County: Hennen, 797.

Webster County: Reger, 1528.

98761-22-11

Carboniferous—Continued.

Wyoming, Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

Caribbean region: Vaughan, 1910.

Cariboo gold fields, British Columbia: MacKay, 1178.

Carnotite, Colorado, southwestern: Burwell, 251.

Cartography.

Barometric surveying in petroleum mapping: Lahee, 1045.

Military and geologic mapping: Bateman, 96.

Plane-table: Bateman, 96.

Radian measures in plane-table mapping: Palmer, 1433.

Reconnaissance mapping: Fuller, 627.

Caves.

Mexico, Pedregal, caves in lava: Wittich, 2063.

Ohio, Put-in-Bay, origin: Cuttingham, 412.

Oregon, Josephine County: Williams, 2033.

South Dakota, Black Hills: Johnson, 1037.

Celestite, Ontario, Renfrew County, Bagot township: Wilson, 2053.

Cement materials: Burchard, 230, 234.

New York, Catskill region: Jones, 951.

Cenozoic Plantae, catalog: Knowlton, 1027.

Central America. *See also* Costa Rica, Guatemala, etc.

Cenozoic history: Vaughan, 1907.

Mesozoic history: Stanton, 1754.

Swamps, coastal: MacDonald, 1172.

Cephalopoda.

Cardioceratidae: Reeside, 1525.

Cuba, Jurassic ammonites: O'Connell, 1384.

Viñales, Jurassic: Sánchez Roig, 1595, 1596.

Holochoanites, genetic relations: Grabau, 683.

Mexico, Coahuila, Turonian ammonite fauna: Böse, 164.

Guerrero, Cretaceous: Burckhardt, 240.

Zacatecas, Jurassic: Burckhardt, 240.

New Mexico, Abo sandstone ammonoids: Böse, 163.

Perisphinctinae, costal development: O'Connell, 1383.

Permo-Carboniferous ammonoids, Glass Mountains, Texas: Böse, 161.

Texas, Weno and Pawpaw formations: Adkins, 6.

Cerium: Watson, 1961.

Chalcopryite deposits, northern Manitoba: Bruce, 211.

Chalk: Ward, 1946.

Changes of level. *See also* Beaches; Shore lines; Terraces.

Alaska: Dall, 451.

Causes, major: Ulrich, 1891.

Champlain submergence, depth along Maine coast: Meserve, 1289.

Coastal Plain, Quaternary: Vaughan, 1914.

Columbia Valley, Pleistocene submergence: Bretz, 192.

Coral reefs and the glacial period: Daly, 453.

Manitoba, Pleistocene: Johnston, 943.

Mexico, Lower California: Wittich, 2070.

New Hampshire, Quaternary: Goldthwait, 668.

New York, eastern: Fairchild, 556.

Genesee River region: Fairchild, 561.

Paleozoic oscillations: Ulrich, 1890.

Pleistocene: Daly, 452.

Post-glacial uplift of New England coastal region: Fairchild, 562, 563.

Post-Pleistocene: Daly, 458.

Quaternary: Daly, 455, 458.

Recent sinking of sea level: Daly, 457, 459.

Vermont, postglacial uplift: Fairchild, 557.

Charcos, origin: Bryan, 215.

Chemical analyses. *See list*, p. 241.

Chert.

Indiana: Bennett, 121.

Origin: Twenhofel, 1867.

Wrexford and Foraker limestones: Twenhofel, 1867.

Chester series in Illinois: Weller, 1974.

Chrome, magnetic and nonmagnetic: Lewis, 1096.

Chrome iron ore.

Cuba, Burch, 229.

occurrences: Ross, 1580.

Chromite: Diller, 500, 501.

Alaska: Mertie, 1283.

Kenai Peninsula: Gill, 652.

British Columbia, Clinton district: Reinecke, 1537.

Lillooet-Prince George region: Reinecke, 1538.

Cuba: Burch, 228; Burchard, 235, 239.

San Miguel de los Baños: Suarez Marias, 1799.

Maryland: Singewald, 1768, 1769.

North Carolina: Lewis, 1098.

Chulitna region, Alaska: Capps, 294.

Classification.

Coal, use classification: Ashley, 41.

Cycadophyta: Wieland, 2030.

Igneous rocks: Mathews, 1228; quantitative mineralogical classification: Johannsen, 928.

Mimetic crystals: Wherry, 1992.

Ore deposits: Tovote, 1856.

Peat deposits: Dachnowski, 440.

Rock classification for engineering: Pirsson, 1473; Smith, 1729.

Springs: Bryan, 216.

Clay.

British Columbia, Clinton district: Reinecke, 1537.

Lillooet-Prince George region: Reinecke, 1538.

California: Boalich, 156.

Composition: Somers, 1737.

Fire clays, northern Appalachian coal basin: Ashley, 44; Lovejoy, 1136.

High-grade American clays, occurrence: Ries, 1553, 1554.

Idaho: Skeels, 1711.

Illinois, Union County, Mountain Glen: St. Clair, 1592.

Indiana, Monroe County: Logan, 1117.

Microscopic examination: Somers, 1737.

Minnesota: Grout, 714.

Ontario, Abitibi and Mattagami rivers: Keele, 966.

northern: Keele, 965.

Pennsylvania, Monroe County, Saylorsburg, white clays: Peck, 1459.

white clay: Hice, 816.

Tennessee, western, ball clays: Schroeder, 1623.

Texas, eastern: Dumble, 524.

Virginia: Ries, 1555.

Climate, geologic. *See* Paleoclimatology.

Clinton district, British Columbia: Reinecke, 1537.

Clinton iron ores, genesis: Smyth, 1735.

Coal: Leshner, 1087, 1088; Stevenson, 1764. *See also* Lignite.

Alaska, Matanuska field: Chapin, 335; Martin, 1219.

Nenana field: Martin, 1217.

Alberta, Brule Lake region: MacVicar, 1196.

Highwood area: Rose, 1576.

Appalachian field: Bryan, 220.

British Columbia, Crowsnest Pass field: Strachan, 1796.

Canada: Gray, 693; western: White, 2009.

Colorado, Mancos district: Collier, 386.

Compilation and composition of bituminous coals: Thiessen, 1829.

Composition: Thiessen, 1828.

Formation: Hackford, 728; Kendall, 978; and origin: Thiessen, 1827.

Geology: Finlay, 594.

Idaho, eastern: Mansfield, 1216.

Teton basin, Horseshoe district: Evans, 553.

Illinois, Colchester and Macomb quadrangles: Hinds, 832.

Hennepin quadrangle: Cady, 267.

La Salle quadrangle: Cady, 267.

low-sulphur coal: Cady, 271.

Saline and Gallatin counties: Cady, 268.

Coal—Continued.

- Indiana: Barrett, 82.
 Monroe County: Logan, 1116.
 Vigo County: Logan, 1121.
 Kentucky: Jillson, 922; Miller, 1293.
 bibliography: Jillson, 915.
 Clay County: Hodge, 840; Sexton Creek area: Russell, 1589.
 Goose Creek region: Hodge, 840.
 Kentucky River, north fork: Hodge, 839.
 Leslie and Harlan counties: Hodge, 838.
 low-sulphur coals: Jillson, 912.
 Magoffin County: Browning, 206.
 production: Jillson, 916.
 Stinking Creek region: Jillson, 904.
 Mexico, Sonora: Paredes, 1447.
 Missouri: Brodie, 200.
 Newfoundland: Haliburton, 732.
 Nova Scotia: Hayes, 771, 773.
 Ohio: Stout, 1795.
 Muskingum County: Stout, 1794.
 Oklahoma: Fuller, 629.
 Origin: Hippard, 833; Runner, 1587.
 Pennsylvania: Ashley, 43.
 low-sulphur coals: Chance, 324.
 Spore exines, use in correlation: Thiessen, 1830.
 Structure in Paleozoic bituminous coals: Thiessen, 1828, 1829.
 Sulphur in coal: Thiessen, 1825, 1826; geological aspects: Ashley, 42.
 Use classification: Ashley, 41.
 Virginia, Tazewell County: Harnsberger, 749.
 Washington, southwestern: Culver, 428.
 West Virginia, Abram Creek-Stony River field: Ashley, 40.
 Fayette County: Hennen, 797.
 sulphur in coals: White, 2008.
 Webster County: Reger, 1528.
 Coal Measures. *See* Carboniferous.
 Cobalt: Drury, 522; Hess, 800, 805, 806.
 Idaho, Lemhi County: Hess, 803.
 Ontario: Drury, 522; Cobalt: Whitehead, 2010.
 Cobble abrasion: Wentworth, 1983.
 Colchester-Macomb folio, Illinois (no. 208): Hinds, 832.
 Colorado.
Areas described.
 Cripple Creek district: Van Tuyl, 1903.
 Platoro-Summitville district: Patton, 1454.
 Twin Lakes district: Howell, 874.
Economic geology.
 Carnotite, Gateway district: Farnum, 573.
 southwestern Colorado: Burwell, 251.
 Coal, Mancos district: Collier, 386.
 Evergreen copper ores, Gilpin County: McLaughlin, 1184.
 Fluorspar deposits: Aurand, 48; Boulder County: Hibbs, 815.
 Gold, Platoro-Summitville district: Patton, 1454.
 Gold, silver, copper, lead, and zinc: Henderson, 790, 793.
 Gypsum: Stone, 1785.
 Manganese: Jones, 948; Muilenburg, 1355.
 Mineral deposits, western slope: Aurand, 49.
 Molybdenite, Climax: Haley, 731.
 Oil possibilities, Routt County: Crawford, 416.
 Oil shales: Alderson, 16, 17; Chase, 337; De Beque, 482; Hoskin, 864; Lunt, 1149.
 Pyrite, Leadville: Lee, 1065.
Historical geology.
 Book Cliffs coal field: Forrester, 610.
 Cretaceous, northeastern Colorado: Henderson, 794.
 Foothills formations, north central Colorado: Henderson, 795.
 Mancos district: Collier, 386.
 Montezuma County, McElmo anticline: Coffin, 375.

Colorado—Continued.

Historical geology—Continued.

- Morrison formation, type section: Lee, 1067.
 Pawnee Creek beds: Loomis, 1123.
 Routt and Moffat counties, anticlines: Perini, 1461.
 Routt County: Crawford, 416.

Mineralogy.

- Anglesite, Gunnison County: Shannon, 1676.
 Pyrite, Bald Mountain: Whitlock, 2014.

Paleontology.

- Amphicoelias: Osborn, 1406.
 Camarasaurus: Osborn, 1406, 1407.
 Cretaceous, northeastern Colorado: Henderson, 794.
 Culex winchesteri, Cathedral Bluffs: Cockerell, 367.
 Dinosauria: McKelvey, 1180.
 Entelodonts: Troxell, 1865.
 Eocene insects: Cockerell, 369.
 Florissant, parasitic Hymenoptera: Cockerell, 368.
 Morrison flora: Knowlton, 1029.
 Ticholeptus rusticus: Loomis, 1124.

Petrology.

- Twin Lakes district: Howell, 874.

Physical geology.

- Building of Rockies: Chamberlin, 312.
 Erosion, Mesa Verde: Haas, 727.
 Montezuma County, McElmo anticline: Coffin, 375.
 Routt and Moffat counties, anticlines: Perini, 1461.
 Routt County anticlines: Crawford, 416.

Physiographic geology.

- Mesa Verde: Haas, 727.
 Rocky Mountains: Chamberlin, 312.

Underground water.

- Mineral waters: George, 643.
 San Luis Valley, hydrology: Headden, 776.

Columnar structure in lavas: James, 897.

Comanchean formation underlying Florida: Sellards, 1649.

Commercial control of mineral resources: Spurr, 1749.

Concretions.

- Missouri, Boone County, origin: Tarr, 1821.

Conglomerate.

- Cobalt conglomerate, origin: Coleman, 382.
 Edgewise conglomerate: Clarke, 352.
 Pennsylvania, Nittany Valley, conglomeratic limestone: Eaton, 534.

Connecticut.

- Middletown region: Cleland, 363.
 Report of survey: Conn. G. S., 397; Gregory, 704.

Historical geology.

- Meriden area: Waring, 1951.
 Norwalk, Suffield, and Glastonbury areas: Palmer, 1434.
 Quaternary, New Haven region: Ward, 1948.

Mineralogy.

- Chatham: Shannon, 1671.
 Datolite, Meriden: Shannon, 1676.
 Meriden: Shannon, 1666.
 Portland, Strickland's quarry: Shannon, 1670.
 Rhodonite, Portland: Foye, 621.
 Triplite, Chatham: Shannon, 1676.
 Trumbull, Long Hill: Shannon, 1677.

Physiographic geology.

- Danbury region, drainage modifications and glaciation: Harvey, 762.
 Postglacial uplift: Fairchild, 562.
 Quaternary, New Haven region: Ward, 1948.
 Terraces: Barrell, 74.

Underground water.

- Meriden area: Waring, 1951.
 Norwalk, Suffield, and Glastonbury areas: Palmer, 1434.

- Cooper limestone, central Missouri: Greger, 698.
 Copper: Bengzon, 119; Butler, 256, 257.
 Alaska: Martin, 1220.
 Chichagof Island, western part: Overbeck, 1411.
 Jack Bay district: Johnson, 930.
 Kennecott: Bateman, 98, 99; Anon., 2105.
 Prince of Wales Island, Salt Chuck mine: Mertie, 1284.
 Prince William Sound: Johnson, 929.
 Arctic Canada: O'Neill, 1392.
 Arizona: Crampton, 414; Heikes, 784, 786; Tovote, 1855.
 Jerome district: Mitchell, 1325; Reber, 1522.
 Ray-Miami region: Ransome, 1507.
 Warren district: Mitchell, 1322, 1323.
 British Columbia, Copper Mountain: Camsell, 284.
 Hidden Creek mine: Campbell, 280.
 Vancouver Island, Barkley Sound: Dolmage, 506; Sunloch district: Dolmage, 507.
 California: Yale, 2093, 2095.
 Canada, Arctic regions: O'Neill, 1392.
 Central States: Dunlop, 527.
 Colorado: Heikes, 790; Henderson, 793.
 Cuba, Pinar del Río: Corral, 409.
 Eastern States: Dunlop, 529; Hill, 822.
 Idaho: Gerry, 644, 646.
 Adams County, I. X. L. prospect: Bell, 116.
 Seven Devils district: Livingston, 1111.
 Manitoba, northern: Bruce, 211; Hanson, 744; Wallace, 1940.
 Mexico, Nacozari district, Sonora, Pilaes mine: Wade, 1923.
 Sonora: Tovote, 1855.
 Michigan: Guck, 720; Lang, 1055; Woods, 2077.
 Lake Superior region: Lang, 1056; Spurr, 1751; Winchell, 2058.
 Montana: Gerry, 645; Heikes, 783.
 Native copper, Nonsuch formation, Michigan: Nishio, 1375.
 Nevada: Heikes, 782, 785.
 New Mexico: Henderson, 789, 792; Tovote, 1855.
 Mogollon district: Scott, 1641.
 Santa Fe County: Berryman, 147.
 Ontario, Sudbury: Bell, 113.
 Oregon: Yale, 2093, 2095.
 Quebec, Eastman, Huntingdon deposit: Hore, 858.
 Richardton meteorite: Quirke, 1504.
 South Dakota: Henderson, 788, 791.
 Texas: Henderson, 789, 792.
 Utah: Butler, 255; Heikes, 781, 787.
 Tintic district: Lindgren, 1105.
 Washington, Gerry, 644, 646.
 Chewelah district: Armstrong, 37.
 Stevens County: Weaver, 1970.
 Wyoming: Henderson, 788, 791.
 Coquihalla area, British Columbia: Camsell, 286.
 Coquina, Florida: Brodie, 199.
 Coral island and reefs: Vaughan, 1909.
 Formation: Vaughan, 1911.
 Origin: Davis, 472; Vaughan, 1909.
 Coral reefs and the glacial period: Daly, 453.
 Corals. *See* Anthozoa.
 Correlation.
 Carboniferous, Kansas and Oklahoma: Goldman, 667.
 Canadian Rockies: Burwash, 249.
 Coal measures, Maryland: Swartz, 1804.
 Coastal Plain area: Brantley, 191.
 Cretaceous: Berry, 145.
 Great Plains region: Twenhofel, 1871.
 Gulf region: Berry, 129.
 Upper: Stanton, 1755.
 Devonian: Grabau, 685.
 western Tennessee: Dunbar, 525.
 Eocene: Berry, 136.

Correlation—Continued.

- General: Schuchert, 1637.
 Interior coal fields: Keyes, 983.
 Michigan, Huronian formations: Allen, 25; Lane, 1053.
 Ordovician: Foerste, 603.
 Panama, Tertiary: Vaughan, 1907.
 Porto Rico, Tertiary formations: Maury, 1248, 1250.
 Pre-Cambrian, northern Ontario and Quebec: Cooke, 407.
 northern Quebec: Cooke, 403.
 Silurian: Williams, 2034.
 Tertiary: Cushman, 435; Vaughan, 1910.
 Bighorn Basin: Hewett, 811.
 southeastern United States: Vaughan, 1907.
 Texas, Bend formation: Girty, 659.
 Comanchean: Adkins, 6.
 Hudspeth County, Carboniferous: Beede, 111.
 Utah: Dake, 443.
 Wyoming, Rock Springs area, Sweetwater County: Schultz, 1639.
- Costa Rica.
Economic geology.
 Manganese: Sears, 1642.
Historical geology.
 General: MacDonald, 1171.
 Guanacaste: Sears, 1642.
Physical geology.
 Volcanoes, Irazu: Tristan, 1862.
 Poas Volcano, eruptions: Tristan, 1861.
- Cretaceous. *See also* Paleontology, Cretaceous.
 Alabama, Coastal Plain: Brantley, 191.
 Alaska, Anvik-Andreafski region: Harrington, 751.
 Kiwalik-Koyuk region: Harrington, 755.
 Alberta, Brule Lake region: MacVicar, 1196.
 Crownsnest coal field, northern part: Rose, 1575.
 Highwood area: Rose, 1576.
 Lower Smoky River: McLearn, 1187.
 Peace and Athabaska valleys: McLearn, 1188.
 southern and central: Slipper, 1712.
 southwestern: Stewart, 1766.
 Swan Hills, Lesser Slave Lake district: Allan, 20.
 western: Purdy, 1501.
- Arkansas: Miser, 1319.
 British Columbia, Coquihalla area: Camsell, 286.
 Lillooet-Prince George region: Reinecke, 1538.
 northeastern: Stewart, 1767.
 Vancouver Island, Barkley Sound: Dolmage, 506.
- California, San Diego County: Ellis, 542.
 Santa Barbara County, Santa Ynez River district: Kew, 980.
 Simi Valley: Kew, 979.
- Colorado, Mancos district: Collier, 386.
 Morrison formation: Lee, 1067.
 north central, foothills formations: Henderson, 795.
 northeastern: Henderson, 794.
 Routt and Moffatt counties: Perini, 1461.
 Routt County: Crawford, 416.
 southwestern: Forrester, 610.
 Twin Lakes district: Howell, 874.
- Correlation: Berry, 145.
 Great Plains region: Twenhofel, 1871.
 Gulf region: Berry, 129.
 Upper Cretaceous: Stanton, 1755.
- Delaware, Wilmington quadrangle: Bascom, 86.
 Florida, Comanchean (underlying): Sellards, 1648, 1649.
 underlying limestones: Cushman, 431, 433.
- Georgia: McCallie, 1519.
 Greenland: Böggild, 157.
 Gulf region: Berry, 129.

Cretaceous—Continued.

- Gulf Coastal Plain: Shaw, 1683.
 Iowa, Adair County: Gow, 679.
 Cass County: Tilton, 1847.
 southwestern: Smith, 1714.
 Kansas: Moore, 1346; Snider, 1736; Twenhofel, 1872.
 Comanchean and Dakota strata: Twenhofel, 1871.
 Syracuse and Lakin quadrangles: Darton, 462.
 Kentucky: Miller, 1293.
 Louisiana, Sabine uplift: Powers, 1483.
 Maekenzie River basin: Camsell, 281.
 Maryland, Elkton quadrangle: Bascom, 86.
 Federal Hill: Berry, 141.
 Mexico, Guerrero, Zumpango: Burckhardt, 240.
 Minnesota: Grout, 715.
 Mississippi: Lowe, 1138, 1140.
 Montana, central: Bowen, 171.
 Fergus County: Freeman, 622.
 Huntley Field: Hancock, 734.
 New Jersey, glauconite beds: Mansfield, 1210.
 New Mexico: Keyes, 993; Knox, 1031.
 Alamosa Creek valley: Winchester, 2061.
 eastern: Baker, 55.
 northeastern: Garrett, 640.
 Pecos Valley: Semmes, 1658.
 Puertecito district: Wells, 1978.
 North America, southern: Stanton, 1754.
 North Dakota: Leonard, 1082, 1084.
 western: Stanton, 1756.
 Oregon: Smith, 1728.
 western: Harrison and Eaton, 761.
 Porto Rico, Coamo-Guayama district: Hodge, 837.
 San Juan district: Semmes, 1655.
 Recedent lake shores: Wieland, 2031.
 South Dakota, Newell quadrangle: Darton, 461.
 western: Stanton, 1756.
 Tennessee, Upper Cretaceous: Wade, 1922.
 western: Schroeder, 1623.
 Texas: Böse, 162; Udden, 1880.
 Bexar County: Sellards, 1650, 1653.
 Butler salt dome: Powers, 1484.
 central: Matteson, 1231.
 Crockett County: Liddle, 1102.
 Dallas County: Shuler, 1696.
 Diablo Plateau: Beede, 110.
 eastern: Dumble, 524.
 Fredericksburg and Washita formations: Adkins, 7.
 Tarrant County: Winton, 2062.
 Terrell County: Christner, 339.
 Weno and Pawpaw formations: Adkins, 6.
 Upper Cretaceous Mississippi gulf: Berry, 135.
 Utah: Butler, 255.
 Carbon County, Farnham anticline: Clark, 344.
 eastern: Forrester, 610.
 Wyoming, Cody region: Hewett, 811.
 Fremont County, Big Sand Draw: Collier, 388.
 Lance Creek field: Hancock, 737.
 Maverick Springs: Collier, 389.
 Mule Creek oil field: Hancock, 736.
 Rock Springs area, Sweetwater County: Schultz, 1639.
 Upton-Thornton oil field: Hancock, 735.
- Crinoidea. *See also* Echinodermata.
 Carboniferous crinoids, parasitism: Moodie, 1335.
 Flexibilia: Springer, 1748.
 Herpetocrinus, Monticello, Iowa: Thomas, 1834.
 Mysticocrinus: Bather, 101.

Crustacea.

- Bunala, Silurian, New York: Clarke, 351, 354.
 Dominican Republic, Tertiary decapods: Rathbun, 1513.
 West Indies, Tertiary decapod: Rathbun, 1512.

Cryolite: Burchard, 232.

Cryptogams. *See* Paleobotany.

Cryptozoon: Rothpletz, 1582.

Crystallography.

- Anorthite: Parsons, 1453.
 Axinite, British Columbia: Poitevin, 1479.
 Barite: Whitlock, 2012.
 Calculations in monoclinic system: Palache, 1426.
 Cerussite, British Columbia: Poitevin, 1480.
 Chalcopyrite, Bergen Hill, New Jersey: Wherry, 1993.
 Columbite, Boothwyn, Pennsylvania: Smith, 1723.
 Crystal structure model: Whitlock, 2017.
 Crystal structures of calcites: Wyckoff, 2091.
 Drawing crystals: Palache, 1419; Porter, 1481.
 Gnomonic projection: Palache, 1418.
 Goldschmidt two-circle method, calculations in hexagonal system: Palache, 1422.
 calculations in isometric system: Palache, 1420.
 calculations in orthorhombic system: Palache, 1424.
 calculations in tetragonal system: Palache, 1421.
 Goniometer, two-circle: Bascom, 88; Palache, 1417.
 Hematite, New Mexico: Foshag, 618.
 Higginsite: Palache, 1425.
 Hopeite: Walker, 1936.
 Manganotantalite, Amelia, Virginia: Lee, 1066.
 Mimetic crystals, classification: Wherry, 1992.
 Model for demonstrating crystal structure: Whitlock, 2017.
 Monazite, Boothwyn, Pennsylvania: Wherry, 1994.
 Weymouth, Massachusetts: Palache, 1426.
 Pyrite, Bald Mountain, Colorado: Whitlock, 2014.
 French Creek, Pennsylvania: Wherry, 1996.
 New York City: Whitlock, 2013.
 Spencerite: Walker, 1936.
 Stephanite, epidote, and calamine: Poitevin, 1478.
 Sulphur: Bichowsky, 148.
 Sundry minerals: Shannon, 1676.
 Triclinic system: Palache, 1427; Parsons, 1453.

Cuba. *See also* West Indies.*Economic geology.*

- Bibliography of carbonaceous materials: Ortega, 1398.
 Chrome ore: Burch, 228, 229; Burchard, 235, 239.
 Chromite, San Miguel de los Baños, Matanzas: Suárez Murias, 1799.
 Copper, Pinar del Río: Corral, 409.
 Iron: Weld, 1972; Santiago: Kimball, 1001.
 Isle of Pines: Suárez Murias, 1797.
 Manganese: Burch, 228, 229; Burchard, 237, 238.
 Pinar del Río, Bahía Honda y La Palma: Suárez Murias, 1798.
 Potash, Santa Clara: Montolieu, 1830.

Historical geology.

- Jurassic: O'Connell, 1385.
 Oxfordian, western Cuba: Brown, 203.
 Pinar del Río, Bahía Honda y La Palma: Suárez Murias, 1798.

Paleontology.

- Jurassic ammonite fauna: O'Connell, 1384; Sánchez Roig, 1595, 1596.
 Squalidae, Miocene and Pliocene, Havana: Sánchez Roig, 1597.
 Tertiary Mollusca: Cooke, 398.

Cycadeoidea, distribution and relationships: Wieland, 2027.

Cycadophyta, classification: Wieland, 2030.

Cystoidea. *See also* Echinodermata.

- Caryella valcourensis, Chazy Limestone: Clark, 346.
 Caryocrinites, appearance of additional arms: Foerste, 607.
 Holocystites: Foerste, 606.
 Stromatocystites, Newfoundland: Schuchert, 1627.

- Dakota flora, age: Berry, 145.
 Data of geochemistry: Clarke, 348.
 Decomposition of rocks. *See* Weathering.
 Definitions.
 Fossil: Field, 592; Miller, 1299.
 Talus and shingle: La Forge, 1042.
 Delaware.
 Areas described.
 Wilmington quadrangle: Bascom, 86.
 Denudation. *See* Erosion.
 Deposition. *See* Sedimentation.
 Deposition of ores. *See* Ore deposits, origin.
 Deserts.
 Mexico, San Luis Potosi, desert phenomena: Wittich, 2064.
 Devonian. *See also* Paleontology, Devonian.
 Acadia Bailey, 53.
 Alberta: Dowling, 517.
 Arctic regions, Ellesmere Land: Holvedahl, 850.
 Arizona, Ray-Miami region: Ransome, 1507.
 Arkansas: Miser, 1319.
 Georgia: McCallie, 1159.
 Greenland: Bøggild, 157.
 northwestern: Koch, 1033.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois: Savage, 1604.
 Hardin County: Weller, 1973.
 southwestern: Savage, 1605.
 Iowa, eastern: Norton, 1381.
 Hackberry stage: Fenton, 580.
 Independence shale, Brandon, Iowa: Thomas, 1835.
 Kentucky: Miller, 1293.
 Allen County: Miller, 1297; Shaw, 1680.
 Barren County: Butts, 259.
 Mackenzie River basin: Camsell, 281.
 Minnesota: Grout, 715.
 Mississippi: Lowe, 1138.
 Missouri: Branson, 190.
 central: Greger, 697.
 Cooper limestone: Greger, 698.
 New Brunswick: Bailey, 52.
 New Mexico: Keyes, 993.
 eastern: Baker, 55.
 New York, Catskill region: Jones, 951.
 Portage stratigraphy: Chadwick, 308.
 Sherburne sandstone: Grabau, 685.
 western: Hussakof, 884.
 Ontario, James Bay region: Savage, 1603.
 Mattagami and Abitibi rivers: Williams, 2041.
 Oregon: Smith, 1727, 1728.
 Quebec, Gaspé County, Lemieux: Mailhot, 1199.
 Tennessee, Overton County: Butts, 258.
 Sumner County: Mather, 1227.
 Utah: Butler, 255.
 Tintic district: Lindgren, 1105.
 Virginia, Oriskany and Helderberg formations: Holden, 845.
 Diagenesis in sedimentation: Schuchert, 1636.
 Diamonds: Ball, 61.
 Diastrophism.
 Atlantic-Arctic region: Holvedahl, 851.
 Paleozoic crustal instability: Schuchert, 1637.
 Planetary nuclei, physical phases: Chamberlin, 321.
 Planetesimal growth: Chamberlin, 322.
 Quebec, northern: Cooke, 403.
 Selective segregation of material forming earth: Chamberlin, 320.
 Shrinkage of the earth: Chamberlin, 319.
 Diatomaceous earth.
 British Columbia, Lillooet-Prince George region: Reinecke, 1538.

- Diatomaceae.
 Alaska, Pribilof Islands: Hanna, 741.
 California, Santa Barbara County, Lompoc: Yermoloff, 2096.
 Mexico, Valle de Toxi: Diaz Lozano, 498.
- Diceratheres: Peterson, 1468.
- Diffusion in vein genesis at Cobalt: Whitman, 2020.
- Dikes.
 Idaho, Coeur d'Alene district: Shannon, 1673.
 Illinois, Hardin County: Weller, 1973.
 New Mexico, Pecos valley: Semmes, 1658.
 New York, Adirondacks, Lyon Mountain region: Miller, 1305.
 Lake Placid quadrangle: Miller, 1303.
 Schroon Lake quadrangle: Miller, 1304.
 Vermont, Cuttingsville: Eggleston, 538.
- Dinosauria. *See* Reptilia.
- Dip components, determination: Lahee, 1043; Palmer, 1432.
- Discoidal structure of the lithosphere: Willis, 2045, 2049.
- Dislocation. *See* Faulting.
- Distribution of land and water on the earth: Reid, 1534.
- District of Columbia.
 Mineralogy.
 Travertine, Rock Creek Park: Stose, 1788.
- Physical geology.
 Georgetown University, Seismographic Station, registration: Tondorf, 1850-1853.
- Dolomite.
 Iowa and New York, composition: Reed, 1523.
 Origin: Tarr, 1818, 1822.
 Wood, replacement by dolomite: Adams, 4.
- Domes.
 Gulf coast salt domes: Hill, 828.
- Dominican Republic.
 Historical geology.
 General: Cooke, 400.
 Miocene formations: Maury, 1249.
- Paleontology.
 Crustacea, Tertiary: Rathbun, 1513.
- Drainage changes.
 British Columbia, Cariboo district: Tyrrell, 1876.
 Connecticut, Danbury region: Harvey, 762.
 Iowa, Boyer River: Lees, 1070.
 Moingona River, preglacial: Keyes, 984.
 Ohio basin: Daly, 458.
 New York, east central: Stoller, 1873.
 Pennsylvania: Williams, 2032.
 Preglacial drainage: Baker, 56.
- Drift deposits. *See* Glacial geology: Ice ages (ancient).
- Drumlins.
 New York, Lake Placid: Upham, 1897.
- Dunkard series of Ohio: Stauffer, 1757.
- Dunes.
 Indiana, northwestern: Barrett, 76.
- Dust fall, March 9, 1918: Winchell, 2057.
- Dynamic geology. *See* Physical geology.
- Earth.
 Figure.
 Discoidal structure of the lithosphere: Willis, 2045.
 Framework of the earth: Davis, 473, 474.
 Genesis: Chamberlin, 316.
 Tectonic adjustment of a rotating straticulate spheroid: Keyes, 982.
 Tectonic form of the continents: Keyes, 988.
- Interior.
 Density and elasticity: Lambert, 1051.
 General: Daly, 456; Willis, 2049.
 Nature of: Adams, 2.
 Magnitude of shrinkage: Chamberlin, 319.
 Rigidity: Michelson, 1291.

Earth—Continued.

Temperature.

Deep borings: Van Orstrand, 1900; White, 2007; Anon., 2107; West Virginia: White, 2006.

Geothermal data of United States: Darton, 464.

Geothermal gradient, Sunset-Midway oil field, California: Rogers, 1566.

Earth movements. *See* Landslides.

Earth sciences as the background of history: Merriam, 1266.

Earthquakes. *See also* Seismology.

Azimuth determination in earthquakes: Urrutia, 1899.

British Columbia, December 6, 1918: Denison, 493.

California, Inglewood, June 21, 1920: Taber, 1807.

Los Angeles region: Arnold, 38.

recent, Palmer, 1430.

registration: Bond, 165; Davis, 468-471.

San Jose: Vickery, 1918.

southern: Mulholland, 1358; Taber, 1808.

1918, 1919: Palmer, 1428, 1429.

Elastic rebound theory: Lawson, 1062.

Geologic theory: Montessus de Ballore, 1828.

Guatemala: Muños, 1361.

Jamaica: Taber, 1806.

Mexico, Guadalajara, 1912: Waitz, 1925.

Sonora, 1887: Aguilera, 9.

Monthly reports: Humphreys, 882.

Oregon: Smith, 1732.

Pacific coast: Townley, 1857.

Panama: Kirkpatrick, 1012.

Porto Rico: Reid, 1530, 1531.

October-November, 1918: Reid, 1532.

Registration, Georgetown University, District of Columbia, 1916-1919: Tondorf, 1850-1853.

United States, 1919: Humphreys, 883.

Virgin Islands: Reid, 1531.

1867-68: Reid, 1533.

Virginia, Warren and Rappahannock counties, September 5, 1919: Watson, 1963.

Blue Ridge region, September 5, 1919; Woolard, 2079.

Echinodermata. *See also* Asteroidea; Blastoidea; Crinoidea; Cystoidea; Echinoidea.

Iowa, Devonian: Thomas, 1832.

Ohio, Brassfield formation: Foerste, 598.

Cedarville: Foerste, 604.

Pelmatozoa, phylogeny and taxonomy: Jaekel, 894.

Wisconsin, Racine: Foerste, 604.

Echinoidea.

Pacific coast region: Kew, 981.

Economic geology (general). *For regional see the particular States. See also* Ore deposits, origin, and the particular products.

Application of geology to mining: Billingsley, 149.

Canada, Arctic regions: Moore, 1342.

ore bodies in pre-Cambrian: Dougherty, 512.

Commercial control of mineral resources: Spurr, 1749.

Determination of ore minerals: Davy, 475.

Economic geology as a profession: Lindgren, 1106.

Economic limits to domestic independence in minerals: Smith, 1717.

Formation of ore bodies: Kendall, 977.

International control of minerals: Leith, 1078.

Internationalization of mineral resources: Leith, 1079.

Metalliferous deposits: Knopf, 1025.

Mineral deposits: Lindgren, 1104.

Mineral resources of world: Spurr, 1750.

Mineral resources work of U. S. Geological Survey: Bastin, 95.

Mineral supplies, United States: McCaskey, 1160.

Mining geology methods at Butte, Montana: Billingsley, 149.

Models for determining structure of bedded rocks: Mehl, 1256.

Nonmetallic mineral deposits: Grabau, 688.

Ore deposits of the Southwest: Tovote, 1856.

Phosphate rock an economic army: Stone, 1775.

Economic geology (general)—Continued.

- Polarized light in the study of ores and metals: Wright, 2083, 2084.
- Prospector's field book: Osborn, 1410.
- Rock products and the war: Loughlin, 1130.
- Strategy of minerals: Smith, 1716.
- Tendencies in study of ore deposits: Knopf, 1025.
- Vein quartz, microscopic study: Adams, 5.
- World view of mineral wealth: Umpleby, 1892.

Edgewise conglomerate: Bassler, 90.

Educational.

- Applied paleontology: Weller, 1976.
- Cooperation in advanced geologic instruction: Gregory, 701.
- Development stages in teaching paleontology: Jackson, 892.
- Geology, use in education: Gregory, 702.
- Mineralogical laboratory, University of Michigan: Kraus, 1034.
- Outline charts in teaching vertebrate paleontology: Mehl, 1254.
- Paleontology: Schuchert, 1634.
- Practical applications of geology and physiography: Cleland, 362.
- Relation of student and teacher: Mathews, 1229.
- Structural and petrographic geology: Kemp, 972.
- Special significance of geology in teaching: Merriam, 1267.
- Teaching of geology: Gregory, 703.
- Teaching historical geology: Cleland, 364.
- Teaching paleobotany: Berry, 142.

Elkton - Wilmington folio, Maryland - Delaware - New Jersey - Pennsylvania (no. 211): Bascom, 86.

Ellenburger formation, north central Texas: Sellards, 1652.

Eocene. *See* Tertiary.Eolian action. *See* Wind work.

Eozoon canadense: Rothpletz, 1582.

Epsomite.

British Columbia, Clinton district: Reinecke, 1537.

Lillooet-Prince George region: Reinecke, 1538.

Erosion.

- Cape Breton, coast erosion: Gray, 694.
- Cobble abrasion: Wentworth, 1983.
- Colorado, Mesa Verde: Haas, 727.
- Desert weathering: Hobbs, 834.
- Michigan, Seul Choix Point Peninsula: Ehlers, 539.
- Sierra Nevada, postglacial denudation: Muir, 1856.
- Tennessee, erosion in clay beds: Schroeder, 1624.

Eruptive rocks. *See* Igneous and volcanic rocks.

Eskers.

- Indiana, Anderson: Reeves, 1526.
- Nova Scotia: Prest, 1490.
- Origin and nature: Prest, 1490.

Evolution.

- Dinosaurs: Matthew, 1238.
- Flowering plants and warm-blooded animals: Berry, 138.
- General: Grabau, 690.
- Geologic climates: Knowlton, 1028.
- Glass-sponge colonies: Clarke, 357.
- Human face: Gregory, 705.
- Man: Matthew, 1247; Osborn, 1409.
- Social evolution: Matthew, 1245.

Excursions.

- New England intercollegiate, sixteenth annual: Cleland, 363.

Experimental investigations.

- Abstraction of potassium during sedimentation: Watson, 1959.
- Enrichment of tungsten ores: Gannett, 636.
- Joint planes, formation: Wright, 2085.
- Lava, oxidation by steam: Ferguson, 585.
- Mechanics of geologic structures: Mead, 1252.
- Rigidity of the earth: Michelson, 1291.
- Subsurface relationships in oil and gas fields: Mills, 1314.
- Thrust faulting, process: Quirke, 1506.

Explorations.

- Smithsonian : Smithsonian Inst., 1733, 1734.
 Falcon Lake district, Manitoba : DeLury, 489.
 Fall Line : LaForge, 1041.
 Farnham anticline, Carbon County, Utah : Clark, 344.
 Faulting.

- Arizona, Ray-Miami region : Ransome, 1507.
 California, southern : Hill, 829.
 Elastic rebound theory : Lawson, 1062.
 Experimental investigation : Mead, 1252.
 Fissure veins, cause : Keyes, 994.
 Great Basin faults, age : Louderback, 1126.
 Idaho, Fort Hall Indian Reservation : Mansfield, 1211.
 Pine Creek district : Jones, 944.
 southeastern : Mansfield, 1212.
 Illinois, Hardin County : Weller, 1973.
 Iowa, Cass County : Tilton, 1847.
 southwestern, Thurman-Wilson fault : Tilton, 1845.
 Kansas, eastern : Fath, 575.
 Montana, belt of oblique faulting : Chamberlin, 313.
 New York, Lake Placid quadrangle : Miller, 1303.
 Orleans County : Chadwick, 311.
 Schroon Lake quadrangle : Miller, 1304.
 Oklahoma, northeastern : Fath, 575.
 Overthrusting, Green Mountains : Foye, 620.
 Texas, Balcones fault zone : Sellards, 1651.
 Thrust faulting, process : Quirke, 1505, 1506.
 Upthrust faulting : Willis, 2044.
 Utah : Butler, 255.
 Sevier Valley : Young, 2100.
 Wasatch region : Butler, 252.
 Wyoming, Heart Mountain overthrust : Hewitt, 811.
 Feldspar : Beach, 105.
 Feldspar determination of metamorphic rocks : Carlson, 295.
 Field work.
 Dip needle, use : Aldrich, 18.
 Measuring folded beds : Hewett, 813.
 Note book and symbols for petroleum geologists : Woodruff, 2076.
 Phenol red, use of : Wherry, 1995.
 Reconnaissance mapping : Fuller, 627.
 Smithsonian : Smithsonian Inst., 1733, 1734.
 Surveying methods : Taylor, 1823.

Fishes. *See* Pisces.Fissures. *See* Faulting.

Florida.

- Sea beach observations : Kemp, 971.
 State geologist's report : Sellards, 1644.

Economic geology.

- Coquina : Brodie, 199.
 Gypsum : Stone, 1785.

Historical geology.

- Comanchean formations underlying Florida : Sellards, 1649.
 Cretaceous age of underlying limestones : Cushman, 433.
 Everglades, sections across : Sellards, 1646.
 General : Sellards, 1647, 1648.
 Underlying rocks : Cushman, 431.
 Vero deposits, age : Chamberlin, 318.

Paleontology.

- Beetles, Vero : Wickham, 2025.
 Human remains, Vero : Hrdlička, 875 ; Sellards, 1645 ; Sterns, 1763.
 Mammalian and fish remains : Hay, 764.
 Miocene Foraminifera : Cushman, 436.

Physical geology.

- Coquina : Brodie, 199.

Fluorspar : Burchard, 232.

- Colorado : Aurand, 48 ; Boulder County : Hibbs, 815.
 Illinois, Hardin County : Weller, 1973.

Fluorspar—Continued.

Kentucky: Miller, 1293.

Mexico, San Luis Potosí, Guadalcázar: Wittich, 2067.

Folding.

Adirondacks: Buddington, 225.

Experimental investigation: Mead, 1252.

Kansas, eastern: Fath, 575.

Lake Erie region: Decker, 483.

Measuring folded beds: Hewett, 813.

Minor folds: Decker, 483.

Oklahoma, northeastern: Fath, 575.

Osage County: Millikan, 1312.

Pre-Cambrian: Ruedemann, 1585.

Foliation.

New York, Lewis County: Buddington, 225.

Footprints.

Massachusetts, Attleboro: Lull, 1148.

Nevada, Carson footprints, origin: Stock, 1771.

Foraminifera.

Florida: Cushman, 431, 436.

Mississippi, Byram: Cushman, 434, 438.

Orthophragmina and Lepidocyclina: Cushman, 435.

Quebec, Gaspé, Bonaventure cherts: Bagg, 51.

Stratigraphic correlation value: Cushman, 437.

West Indies: Cushman, 432.

Formations. *See* Geologic formations.

Fort Dodge gypsum, Iowa: Lees, 1072.

Fossil, use of term: Field, 592; Miller, 1299.

Fossilization.

Wood, replacement by dolomite: Adams, 4.

Wood turned to opal: Whitlock, 2016.

Fossils. *See* Paleontology.

Framework of the earth: Davis, 473, 474.

Franklin.

Mineralogy.

Prehnite, Admiralty Inlet, Raffenland: Simmersbach, 1705.

Fuller's earth: Middleton, 1292.

Garnet.

North Carolina: Katz, 957.

Gas. *See* Natural gas.Gastropoda. *See also* Mollusca.

Helicina occulta, Iowa: Shimek, 1691.

Orthaulax, distribution: Cooke, 399.

Turritella, Buda and Georgetown limestones, Texas: Ellisor, 546.

Gems: Schaller, 1609.

Genesis of ores. *See* Ore deposits, origin.

Geochemistry.

Abstraction of potassium during sedimentation: Watson, 1959.

Aragonite deposited from sea water: Wells, 1982.

Data of geochemistry: Clarke, 348.

Kilauea, Hawaii, gases, composition: Shepherd, 1688.

Lava, oxidation by steam: Ferguson, 585.

Mauna Loa, Hawaii, gases: Shepherd, 1689.

Mineral sulphide water, analysis: Fairchild, 568.

Oil, gas, and water, relations in Sunset-Midway field, California: Rogers, 1566.

Problems: Sosman, 1742.

Silicate and carbonate rocks, analysis of: Hillebrand, 830.

Geologic climate. *See* Paleoclimatology.Geologic formations, tables. *For geologic formations described see list p. 244.*

Alabama, southern: Harper, 750.

Alaska, northern, Canning River region: Leffingwell, 1074.

Alberta, lower Smoky River: McLearn, 1187.

southwestern: Stewart, 1766.

Arizona, northwestern: Shimer, 1693.

Arkansas, Batesville district: Miser, 1320.

British Columbia, Ainsworth district: Schofield, 1619.

Lillooet-Prince George region: Reinecke, 1538.

northeastern: Stewart, 1767.

Geologic formations, tables—Continued.

British Columbia—Continued.

Rocky Mountains: Schofield, 1621.

Slocan area: Bancroft, 66.

Vancouver Island, Barkley Sound: Dolmage, 506.

California, San Diego County: Ellis, 542.

Simi Valley: Kew, 979.

Canada, Mackenzie River basin: Camsell, 281.

Colorado, north central, foothills formations: Henderson, 795.

Cretaceous, Upper: Stanton, 1755.

Devonian: Savage, 1604; western Tennessee: Dunbar, 526.

Dominican Republic: Cooke, 400.

Florida: Sellards, 1647, 1648.

Georgia: McCallie, 1149.

Idaho, eastern: Mansfield, 1216.

Fort Hall Indian Reservation: Mansfield, 1211.

Illinois, Hardin County: Weller, 1973.

Indiana: Logan, 1120.

Iowa, Adair County: Gow, 679.

Cass County: Tilton, 1847.

north central: Fenton, 580.

Kansas: Moore, 1349; Snider, 1736.

Kentucky: Miller, 1293.

Allen County: Miller, 1297.

Mesozoic and Cenozoic: Knowlton, 1027.

Missouri: Dake, 441.

Montana, central: Bowen, 171.

New Brunswick: Bailey, 52.

New Jersey, Cretaceous and Eocene: Mansfield, 1209.

New Mexico: Keyes, 993.

Alamosa Creek valley: Winchester, 2061.

North Dakota: Leonard, 1082; western: Stanton, 1756.

Ohio, Muskingum County: Stout, 1794.

Oregon: Smith, 1728; western: Harrison and Eaton, 761.

Pacific region, Mesozoic and Cenozoic: Kew, 981.

Panama: Vaughan, 1910.

Tertiary: Vaughan, 1907.

Tertiary marine: Cushman, 435.

Porto Rico, Tertiary formations: Maury, 1248.

Pre-Cambrian, Michigan: Allen, 25.

Quebec, Coleraine area: Knox, 1030.

Harricana-Turgeon basin: Tanton, 1813.

Silurian, southwestern Ontario: Williams, 2034.

Southeastern United States: Vaughan, 1910.

South Dakota, Black Hills region: O'Hara, 1389.

western: Stanton, 1756.

Tennessee, western valley: Dunbar, 525.

Tertiary: Canu, 290; Peterson, 1468; southeastern United States: Vaughan, 1907.

Texas, Bexar County: Sellards, 1653.

Comanchean: Adkins, 6.

Cretaceous: Böse, 162.

Crockett County: Liddle, 1102.

Utah: Dake, 443.

Tintic district: Lindgren, 1105.

Wyoming: Morgan, 1352.

Lance Creek field: Hancock, 737.

Mule Creek oil field: Hancock, 736.

Rock Springs area, Sweetwater County: Schultz, 1639.

Thermopolis district: Collier, 387.

Upton-Thornton oil field: Hancock, 735.

Geologic history.

Adirondacks: Alling, 26.

Alabama, Coastal Plain: Brantley, 191.

Alaska, Anvik-Andreafski region: Harrington, 751.

Kantishna region: Capps, 291.

Alberta, southern and central: Slipper, 1712.

southwestern: Stewart, 1766.

Geologic history—Continued.

- Arizona, Bright Angel quadrangle: Noble, 1376.
 Jerome district, Yavapai County: Reber, 1522.
 Ray-Miami region: Ransome, 1507.
 San Carlos Indian Reservation: Schwennesen, 1640.
 British Columbia, Ainsworth district: Schofield, 1619.
 Purcell trench: Schofield, 1621.
 California, San Diego County: Ellis, 542.
 Canadian Rockies: Burwash, 249, 250.
 Caribbean region: Vaughan, 1910.
 Central America: Vaughan, 1907, 1910.
 Colorado, north central, foothills formations: Henderson, 795.
 Twin Lakes district: Howell, 874.
 Crustal deformation: Schuchert, 1637.
 Delaware, Wilmington quadrangle: Bascom, 86.
 Florida: Cushman, 433.
 Georgia, Cartersville district: Hull, 878.
 Greenland: Bøggild, 157.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois: Cady, 270.
 Colchester and Macomb quadrangles: Hinds, 832.
 Hennepin quadrangle: Cady, 267.
 La Salle quadrangle: Cady, 267.
 Indiana, Greene County, eastern: Malott, 1205.
 Kansas, Syracuse and Lakin quadrangles: Darton, 462.
 western: Twenhofel, 1871.
 Lake Erie region: Decker, 483.
 Louisiana, Sabine uplift: Powers, 1483.
 Manitoba, northern: Bruce, 211.
 Maryland, Elkton quadrangle: Bascom, 86.
 Mesozoic, southern North America: Stanton, 1754.
 Mesozoic floras of North and South America: Knowlton, 1026.
 Mexico: Lewis, 1100.
 Michigan, pre-Cambrian: Allen, 25.
 Mid-Continent oil fields: Bosworth, 169.
 Minnesota: Grout, 715.
 Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.
 Mississippi Valley, upper, late Paleozoic: Van Tuyl, 1901.
 Montana, central, Upper Cretaceous: Bowen, 171.
 Fergus County: Freeman, 622.
 New Mexico, Taos Range: Gruner, 720.
 New York, Adirondacks: Miller, 1310.
 Canton quadrangle: Chadwick, 310.
 Genesee River region: Fairchild, 561.
 Lake Clear region: Alling, 26.
 Lake Placid quadrangle: Miller, 1303.
 Pleistocene: Fairchild, 564.
 Schroon Lake quadrangle: Miller, 1304.
 Oregon: Smith, 1728.
 Pleistocene: McCornack, 1165.
 western: Harrison and Eaton, 761.
 Oriskany formation: Fettke, 588.
 Paleozoic, Atlantic-Artic region: Høltedahl, 851.
 Porto Rico: Berkeley, 124.
 Coamo-Guayama district: Hodge, 837.
 Pottsville formation: Fettke, 588.
 Quebec, Coleraine area: Knox, 1030.
 northern: Cooke, 403.
 Rocky Mountains: Keyes, 995.
 South Dakota, Black Hills region: O'Harra, 1389.
 Newell quadrangle: Darton, 461.
 Tennessee, Rutherford County: Galloway, 633.
 western valley: Dunbar, 525.
 Texas, central: Matteson, 1231.
 Dallas County: Shuler, 1696.
 eastern: Dumble, 524.

Geologic history—Continued.

Upper Cretaceous Mississippi Gulf: Berry, 135.

Utah: Schneider, 1613.

Tintic district: Lindgren, 1105.

Vermont, Barre: Perkins, 1466.

central: Richardson, 1544.

Northfield: Richardson, 1545.

Pleistocene history: Fairchild, 557.

Virgin Islands: Vaughan, 1915.

Washington: Weaver, 1969.

Stevens County: Weaver, 1970.

West Indies: Matthew, 1239; Vaughan, 1907.

Geologic maps.

Alabama: Smith, 1713; (part): Brantley, 191.

northern: Semmes, 1657.

Alaska, Anvik-Andreafski region: Harrington, 751.

Canyon Creek: Overbeck, 1412.

Chichagof Island, western part: Overbeck, 1211.

Chulitna region, upper: Capps, 294.

Jack Bay district: Johnson, 930.

Kahiltna Valley: Mertie, 1282.

Kennebec: Bateman, 98.

Kiwalik-Koyuk region: Harrington, 755.

Marshall mining district: Harrington, 751.

Nenana field: Martin, 1217.

Nenana-Kantishna region: Capps, 291.

Porcupine district: Eakin, 530.

southeastern: Burchard, 236.

Talkeetna Mountains, western: Capps, 293.

Tolstoi district: Harrington, 752.

Alberta, Ribstone Valley: Dowling, 517.

southern: Stewart, 1766.

Arctic regions, Ellesmere Land: Høltedahl, 850.

Arizona, Bisbee district: Jones, 946.

Cave Creek district: Lewis, 1095.

Globe-Ray region: Ransome, 1507.

Jerome district, Yavapai County: Reber, 1522.

Miami district: Ransome, 1507.

Ray district: Ransome, 1507.

San Carlos Indian Reservation: Schwennesen, 1640.

Tombstone district: Jones, 946.

Tucson and Amole Mountains: Jenkins, 901.

Arkansas: Ferguson, 582.

Batesville district: Miser, 1320.

Black Hills region: O'Harra, 1389.

British Columbia: Schofield, 1618.

Ainsworth district: Schofield, 1619.

Copper Mountain: Camsell, 284.

Hazleton: O'Neill, 1390.

Purcell trench: Schofield, 1621.

Vancouver Island, East Sooke Peninsula: Cooke, 402.

Vancouver Island, Sunloch district: Dolmage, 507.

California, Del Norte County: Logan, 1115.

San Diego County: Ellis, 542.

San Jacinto and Temecula basins: Waring, 1950.

Santa Barbara County, Santa Ynez River district: Kew, 980.

Santa Clara Valley: Reinhard, 1539.

Simi Valley: Kew, 979.

Siskiyou County, Salmon River district: Logan, 1115.

Sunset-Midway field: Pack, 1415.

Canada, Mackenzie River basin: Camsell, 281.

platinum occurrences: O'Neill, 1391.

Coal fields: U. S. Geol. Survey, 1894.

Colorado, Mancos district: Collier, 386.

Montezuma County, McElmo anticline: Coffin, 375.

north central, foothills formations: Henderson, 795.

Platoro-Summitville district: Patton, 1454.

Geologic maps—Continued.

Colorado—Continued.

Routt and Moffat counties: Perini, 1461.

Routt County: Crawford, 416.

Twin Lakes district: Howell, 924.

Connecticut, Glastonbury area: Palmer, 1434.

Meriden area: Waring, 1951.

Norwalk area: Palmer, 1434.

Suffield area: Palmer, 1434.

Cretaceous deposits, eastern Gulf region: Berry, 129.

Delaware, Wilmington quadrangle: Bascom, 86.

Florida: Sellards, 1647, 1648.

Georgia: McCallie, 1159.

Cartersville district: Hull, 878, 880.

Greenland: Böggild, 157.

Gulf Coastal Plain: Urbina, 1898.

Idaho: Bell, 118.

eastern: Mansfield, 1216.

Fort Hall Indian Reservation: Mansfield, 1111.

Pine Creek district: Jones, 944.

Seven Devils district: Livingston, 1111.

south central: Umpleby, 1893.

Wardner district: Rickard, 1551.

Yellow Pine district: Larsen, 1059.

Illinois, Colchester and Macomb quadrangles: Hinds, 832.

Hardin County and Pope County (part): Weller, 1973.

Hennepin quadrangle: Cady, 267.

Hennepin and La Salle quadrangles, surficial geology: Cady, 267.

La Salle quadrangle: Cady, 267.

mineral industries: Christensen, 338.

northeastern: Anderson, 30.

Saline and Gallatin counties: Cady, 268.

Indiana: Logan, 1120.

Greene County: Logan, 1119; eastern: Malott, 1205.

Lawrence County: Logan, 1119.

Martin County: Logan, 1119.

Monroe County: Logan, 1119.

Orange County: Logan, 1119.

Owen County: Logan, 1119.

Iowa, Adair County: Gow, 679.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

drift sheets: Kay, 963.

eastern: Norton, 1381.

north central: Fenton, 580.

Ringgold County, surface deposits: Arey, 35.

Taylor County, surface deposits: Arey, 36.

Kansas, Allen and Neosho counties: Moore, 1347.

oil and gas fields: U. S. Geol. Survey, 1895.

Quaternary deposits: Moore, 1346.

Syracuse and Lakin quadrangles: Darton, 462.

Wilson and Montgomery counties: Moore, 1348.

Kansas and Oklahoma: Snider, 1736.

Kansas and the adjoining region: Moore, 1346.

Kentucky: Jillson, 920.

Allen County: Miller, 1297; Shaw, 1680.

Barren County: Butts, 259.

Breathitt County: Jillson, 914.

Knott County: Jillson, 914.

Tennessee, and Virginia (parts): Shaw, 1680.

Warren County: Shaw, 1680.

Kentucky and adjacent regions: Jillson, 903.

Mackenzie River basin: Camsell, 281.

Manitoba, Reed, and Wekusko lakes region: Alcock, 10.

Maryland, Cambrian, and Ordovician: Bassler, 90.

Elkton quadrangle: Bascom, 86.

Geologic maps—Continued.

- Mexico: Iglesias, 888; Lewis, 1100.
 Hidalgo, Apan district: Camacho, 275.
 Zacualpan district: Lewis, 1100.
 Michigan, Lower Peninsula: Phalen, 1469.
 Marquette and Menominee districts: Winchell, 2058.
 Mid-Continent oil fields: Bosworth, 169.
 Minnesota: Sardeson, 1600.
 clay materials: Grout, 715.
 eastern Mesabi range: Grout, 716.
 Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.
 surface formations: Leverett, 1092.
 Mississippi: Lowe, 1138, 1139.
 Montana, Huntley field: Hancock, 734.
 Jordan coal field: Bowen, 171.
 Stanford hematite district: Westgate, 1985.
 Nevada, Pleistocene Lake beds: Clark, 347.
 New Brunswick, Burnthill Brook area: Young, 2097.
 New Mexico, Alamosa Creek valley: Winchester, 2061.
 Puertecito district: Wells, 1978.
 Taos Range: Gruner, 720.
 New York, Canton quadrangle: Chadwick, 310.
 Catskill region: Jones, 951.
 Cohoos quadrangle, glacial: Stoller, 1774.
 eastern, Pleistocene: Fairchild, 556.
 Lake Bonaparte-Lowville quadrangles: Buddington, 225.
 Lake Placid quadrangle: Miller, 1303.
 Rochester district, Pleistocene: Fairchild, 561.
 St. Regis and Saranac quadrangles (parts): Alling, 26.
 St. Regis and Saranac quadrangles (parts), glaciation: Alling, 26.
 Schroon Lake quadrangle: Miller, 1304.
 North America: Pirsson, 1474.
 North Dakota: Leonard, 1082.
 western: Stanton, 1756.
 Nova Scotia, Malagash Peninsula, Cumberland County: Hayes, 772.
 Ohio: Bownocker, 182.
 Dunkard series: Stauffer, 1757.
 Oklahoma, Osage Reservation: Goldman, 667; Heald, 777-780; Hopkins, 854; Ross, 1578.
 Ontario, Argonaut gold mine: Knight, 1020.
 Ben Nevis area: Knight, 1019.
 glacial shore lines: Ledoux, 1063.
 Gowanda area: Burrows, 245.
 Kirkland Lake area: Burrows, 246.
 Matachewan district: Cooke, 401.
 Niagara Peninsula: Williams, 2034.
 Nipissing district, Cedar and Net lakes: Knight, 1018.
 Ontario Peninsula: Williams, 2034.
 phosphate area: Spence, 1745.
 Renfrew County (part): Wilson, 2053.
 southwestern: Williams, 2035.
 Sudbury district, Windy Lake nickel area: Knight, 1018.
 Thunder Bay district: Tanton, 1815.
 Timiskaming: Cross, 422; Hume, 881.
 Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.
 West Shiningtree area: Hopkins, 856.
 Quebec, Amherst township: Wilson, 2051.
 Coleraine area: Knox, 1030.
 Gaspé County, Lemieux: Mailhiot, 1199.
 Harricanaw-Turgeon region: Tanton, 1813.
 Lake Demontigny region: Mailhiot, 1202.
 Percé: Clarke, 350.
 phosphate area: Spence, 1745.
 Panama, Canal Zone: MacDonald, 1170.
 Porto Rico: Berkey, 124.
 Coamo-Guayama district: Hodge, 837.
 San Juan district: Semmes, 1655.

Geologic maps—Continued.

South Dakota, Black Hills region: O'Harra, 1389.

Newell quadrangle: Darton, 461.

western: Stanton, 1756.

Tennessee: Jenkins, 899.

Overton County (part), structure: Butts, 258.

Rutherford County: Galloway, 633.

Upper Cretaceous: Wade, 1922.

western valley: Dunbar, 525.

Texas: Currier & Company, 429; Snider, 1736.

Bexar County: Sellards, 1653.

central east: Dumble, 524.

Crockett County: Liddle, 1102.

Dallas County: Shuler, 1696.

Diablo Plateau: Beede, 110.

Eastland and Stephens counties, structural conditions: Adams, 1.

north central: Hager, 730.

Pecos Valley: Liddle, 1102.

Petrolia field: Shaw, 1685.

Tarrant County: Winton, 2062.

Terrell County: Christner, 339.

United States, peat deposits: Osborn, 1400.

Utah: Butler, 255.

Carbon County, Farnham anticline: Clark, 344.

Tintic district: Lindgren, 1105.

Tintic quadrangle: Lindgren, 1105.

Vermont, Cuttingsville: Eggleston, 538.

Northfield: Richardson, 1545.

Roxbury: Richardson, 1546.

Virginia, Blue Ridge, west foot: Stose, 1786.

Tazewell County: Harnsberger, 749.

Washington, southwestern: Culver, 428.

Stevens County: Weaver, 1970.

West Virginia, Abram Creek-Stony River field: Ashley, 40.

Fayette County: Hennen, 797.

Webster County: 1528.

Wyoming: Morgan, 1852.

Cody region: Hewett, 811.

Lance Creek field: Hancock, 737.

Mule Creek oil field: Hancock, 736.

Rock Springs area, Sweetwater County: Schultz, 1639.

Upton-Thornton oil field: Hancock, 735.

Geologic time.

Laminated deposits: De Geer, 484.

Pleistocene clays as a chronometer: Fairchild, 567.

Postglacial time, measurement: Gleason, 662.

Geological surveys. *See* Surveys.

Geologists as expert witnesses: Ransome, 1511.

Geologists as witnesses in mining litigation: Leith, 1081.

Geology in the law: Kemp, 973.

Geology in the world war and after: Cross, 423.

Geology in war: DeWolf, 494.

Geomorphogeny. *See* Physiographic geology.

Geomorphology. *See* Physiographic geology.

Geomorphology. *See* Earth, figure.

Geophysics.

Problems: Sosman, 1742.

Georgia.

Economic geology.

Barytes deposits: Hull, 930.

Gold, McDuffie County: Bruhl, 212.

Manganese: Hull, 928; Stose, 1792.

Ocher deposits, Cartersville: Haney, 740.

Oil prospect near Scotland, Telfair County: Hull, 879.

Potash slates, Cartersville: Maynard, 1251.

Historical geology.

Cartersville district: Hull, 928, 930.

Cretaceous: Berry, 129.

Georgia—Continued.

Historical geology—Continued.

General: McCallie, 1159.

Telfair County: Hull, 879.

Paleontology.

Cretaceous floras: Berry, 129.

Geotectonic adaptation through retardation of the earth's rotation: Keyes, 987.

Geothermal data of United States: Darton, 464.

Geothermal gradient, Sunset-Midway oil field, California: Rogers, 1566.

Gilsonite.

Utah: Bardwell, 68.

Glacial geology. *See also* Quaternary.

Alaska, northern, Canning River region: Leffingwell, 1074.

British Columbia: Tyrrell, 1875.

Cariboo district: Tyrrell, 1876.

Colorado, Twin Lakes district: Howell, 874.

Connecticut, Danbury region: Harvey, 762.

New Haven region: Ward, 1948.

Coral reefs and the glacial period: Daly, 453.

Glacial epoch, cause: Wright, 2088.

Gumbotil, origin: Kay, 963.

Ice age in North America: Wright, 2088.

Illinois, Chicago area: Salisbury, 1594.

Hennepin quadrangle: Cady, 267.

La Salle quadrangle: Cady, 267.

Pleistocene: Leighton, 1077.

Indiana, northwestern: Barrett, 76.

Iowa, Adair County: Gow, 679.

Camp Dodge region: Lees, 1069.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

Des Moines: Keyes, 996.

Louisa and Washington counties: Schoewe, 1615.

Ringold County: Arey, 35.

Taylor County: Arey, 36.

Union County, Aftonian gravels: Kay, 964.

Wisconsin and Iowan drifts: Cable, 262.

Iowan-Wisconsin border, Iowa: Cable, 263.

Juan de Fuca lobe of Cordilleran ice sheet: Bretz, 193.

Labrador ice sheet, extent and thickness: Coleman, 380.

Lake Chicago basin: Baker, 56.

Maine, Mount Desert Island: Bascom, 87.

Manitoba, Knee Lake district: Bruce, 210.

Michigan, Kalamazoo area: Leverett, 1093.

Minnesota: Grout, 715; Leverett, 1092.

Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.

New England: Daly, 458.

southern: Fairchild, 562.

Newfoundland, southeastern: Buddington, 226.

New Hampshire: Goldthwait, 669.

New York, Canton quadrangle: Chadwick, 310.

Cohoes quadrangle: Stoller, 1774.

eastern: Fairchild, 556.

Genesee River region: Fairchild, 561.

Lake Clear region: Alling, 26.

Lake Placid quadrangle: Alling, 27.

northern: Fairchild, 566.

Pleistocene: Fairchild, 564.

Schroon Lake quadrangle: Miller, 1304.

North America: Wright, 2088.

North Dakota: Leonard, 1082.

Pleistocene deposits: Todd, 1849.

Ontario, Abitibi and Mattagami rivers: Keele, 966.

Oregon: Smith, 1728.

Pleistocene history: McCornack, 1165.

Pennsylvania: Williams, 2032.

Pleistocene clays as a chronometer: Fairchild, 567.

Glacial geology—Continued.

- Prince Edward Island: Coleman, 379.
 Quebec, Magdalen Islands: Coleman, 379.
 Saskatchewan, southeastern: Stansfield, 1752.
 Vermont, Northfield: Richardson, 1545.
 Roxbury: Richardson, 1546.
 Washington, Juan de Fuca: Glacier: Bretz, 193.
 Wyoming, Beartooth Plateau: Dake, 442.
 Glacial Lakes. *See also* Beaches; Shore lines; Terraces.
 Indiana, northwestern: Barrett, 76.
 Lake Agassiz: Leonard, 1082.
 Lake Chicago: Baker, 56.
 Lake Dawson: Fairchild, 561.
 Lake Iroquois: Fairchild, 561.
 Michigan, Kalamazoo area: Leverett, 1093.
 New York, Cohoes quadrangle: Stoller, 1774.
 eastern: Fairchild, 556.
 Genesee River region: Fairchild, 561.
 Lake Clear region: Alling, 26.
 Lake Placid quadrangle: Alling, 27.
 Schroon Lake quadrangle: Miller, 1804.
 Glacial period. *See* Glacial geology.
 Glacial Lake section, Alberta: Walcott, 1928.
 Glaciers.
 Alaska: Chamberlin, 315.
 northern, Canning River region: Leffingwell, 1074.
 British Columbia, Yoho Glacier, movement, 1917-19: Wheeler, 1987.
 Canada, Rocky Mountains: Wheeler, 1986.
 Yukon, Klutlan Glacier: Lambart, 1048.
 Glades.
 Origin: Galloway, 633.
 Glass sand: Richardson, 1547.
 Kentucky: Richardson, 1547.
 Pennsylvania: Fettke, 588.
 Virginia: Watson, 1962.
 Glauconite: Goldman, 664.
 Missouri, southeastern: Ross, 1577.
 New Jersey: Mansfield, 1209, 1210, 1215.
 Origin: Mansfield, 1215; Tarr, 1819.
 Glossary of mining and mineral industry: Fay, 576.
 Gold: Dunlop, 523; McCaskey, 1162; Wuensch, 2090.
 Alaska: Martin, 1220.
 Anvik-Andreafski region: Harrington, 751.
 Chichagof Island, western part: Overbeck, 1411.
 Chistochina region: Chapin, 330.
 Fairbanks district: Chapin, 331.
 Hot Springs district: Chapin, 333.
 Jack Bay district: Johnson, 930.
 Kahiltna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kenai Peninsula: Johnson, 931.
 Kiwalik-Koyuk region: Harrington, 755.
 Kodiak Island: Maddren, 1198.
 Porcupine district: Eakin, 530.
 Prince William Sound: Johnson, 929.
 Seward Peninsula: Cathcart, 305.
 Tolovana district: Overbeck, 1413.
 Tolstoi district: Harrington, 752.
 Willow Creek district: Capps, 292; Chapin, 336.
 Arizona: Heikes, 784, 786.
 British Columbia: Camsell, 288.
 Cariboo district: MacKay, 1177, 1178; Tyrrell, 1876.
 Coquihalla area: Camsell, 286.
 California: Yale, 2093, 2095.
 Nevada County: Mac Boyle, 1156.
 Plumas County: Mac Boyle, 1157.
 Sierra County: Mac Boyle, 1158.

Gold—Continued.

- Colorado: Henderson, 790, 793.
 Cripple Creek district: Van Tuyl, 1903.
 Platoro-Summitville district: Patton, 1454.
 Twin Lakes district: Howell, 874.
 Eastern States: Dunlop, 529; Hill, 822.
 Georgia, McDuffie County: Bruhl, 212.
 Idaho: Gerry, 644, 646.
 Boise Basin district: Ballard, 62.
 Manitoba, Copper Lake district: Wallace, 1941.
 southeastern: Bruce, 209.
 Reed and Wekusko lakes region: Alcock, 10.
 Mexico, San Luis Potosi, Guadalcazar: Wittich, 2069.
 Montana: Gerry, 645; Heikes, 783.
 Nevada: Heikes, 782, 785.
 Divide district: Carpenter, 296; Sizer, 1710; Young, 2098.
 New Mexico: Henderson, 789, 792.
 Mogollon district: Scott, 1641.
 Nicaragua, eastern: Garbrecht, 637.
 Nova Scotia, southwestern: Faribault, 572.
 Ontario, Argonaut gold mine: Knight, 1020.
 Ben Nevis area: Knight, 1019.
 Kirkland Lake area: Burrows, 246; Johnson, 934.
 Larder Lake area: Hopkins, 905.
 Lightning River area: Burrows, 243.
 Matachewan district: Burrows, 244; Cooke, 401, 404, 405.
 Michipicoten district: Collins, 390.
 Montreal River district: Anon., 2106.
 Porcupine field: Bell, 114; Dougherty, 511.
 Sudbury district, Wasapika area: Hore, 857, 859, 860, 861.
 Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.
 West Shining Tree district: Goodwin, 671; Hopkins, 856.
 Oregon: Yale, 2093, 2095.
 Josephine County, Waldo district: Kellogg, 969.
 Quebec: Harrikanaw River area: Mailhoit, 1201.
 Lake Demontigny region: Mailhoit, 1202.
 South Dakota: Henderson, 788, 791.
 Southern States: Megraw, 1253.
 Texas: Henderson, 789, 792.
 Utah: Butler, 255; Heikes, 781, 787.
 Tintie district: Lindgren, 1105.
 Washington: Gerry, 644, 646.
 Stevens County: Weaver, 1970.
 Wyoming: Henderson, 788, 791.
 Yukon, Mayo area: Cockfield, 370, 373.
 Gowganda silver area, Ontario: Burrows, 245.
 Grand Canyon. *See* Arizona.
 Granite.
 Vermont, Barre: Perkins, 1466.
 Graphite: Dub, 523; Ferguson, 581; Spearman, 1743; Spence, 1744.
 Alabama: Brumell, 213; Prouty, 1499.
 Alaska, Seward Peninsula: Harrington, 754.
 Canada: Spence, 1744.
 Mexico, Sonora: Paredes, 1447.
 Ontario, Ottawa Valley: Wilson, 2053.
 Renfrew district: Wilson, 2053.
 Quebec: Brumell, 213.
 Amherst township: Wilson, 2051.
 Buckingham district: Brumell, 214.
 Gravel: Stone, 1777, 1781.
 Illinois: Leighton, 1076.
 Missouri: Dake, 441.
 Ontario: Ledoux, 1063.
 Graptolitoidea.
 Vermont, Northfield: Richardson, 1545.

Greenland.

Geology: Bøggild, 157.

Historical geology.

Northwestern Greenland: Koch, 1033.

Mineralogy.

Dahllite, Kangerdluarsuk: Bøggild, 158.

Leifite, Narsarsuk: Bøggild, 159.

Paleontology.

Aralias, Cretaceous: Fritel, 625.

Greensand. *See* Glauconite.

Ground ice, northern Alaska: Leffingwell, 1074.

Ground water. *See* Underground water.

Guatemala.

Economic geology.

Saltpeter: Gale, 632.

Physical geology.

Earthquakes: Muñoz Lumbier, 1361.

Gulf coast salt domes: Hill, 828.

Gumbotil, origin: Kay, 963.

Gundint iron district, Minnesota: Broderick, 198.

Gypsum: Stone, 1782, 1784.

United States: Stone, 1785.

Hackberry stage, Devonian, Iowa: Fenton, 580.

Harricaw-Turgeon basin, northern Quebec: Tanton, 1813.

Hawaiian Islands.

Petrology.

General: Powers, 1486.

Physical geology.

Halemaumau: Finch, 593; Jaggar, 895.

Kilauea: Jagger, 895.

activity: MacCaughy, 1163.

composition of gases: Shepherd, 1688.

lava tube: Powers, 1485.

volcano observatory: Cross, 425.

Mauna Loa, gases: Shepherd, 1689.

Seismometric investigation of lava column: Jaggar, 896.

Volcanoes: Hawaiian Volcano Observatory, 763; Jagger, 896.

Hazleton district, British Columbia: O'Neill, 1390.

Heart Mountain overthrust, Wyoming: Hewett, 811.

Helium: Rogers, 1570; in natural gases: McLennan, 1192.

Hematite and magnetite, relations: Broderick, 196.

Herman-Morris folio, Minnesota (no. 210): Sardeson, 1600.

Heterolasma foerstei, Niagaran tetracoral, Michigan: Ehlers, 540.

Highwood coal area, Alberta: Rose, 1576.

Historical geology (general). *For regional see names of States. See also the different systems; Correlation; Geologic formations, tables.*

Contorted strata: Winchester, 2059.

Gulf Coastal Plain: Shaw, 1683.

Identification of geological formations: Udden, 1880.

Interior coal fields: Keyes, 983.

Mississippian: Keyes, 999.

Mud-crack horizons, Ordovician: Kindle, 1007.

Permo-Carboniferous deposition conditions: Case, 298.

Principles of correlation: Berry, 144.

Rocky Mountain region: Dake, 445.

Silurian-Devonian boundary: Schuchert, 1635.

Taconic system resurrected: Schuchert, 1625.

History, philosophy, etc.

General: McNairn, 1194.

Iowa: Keyes, 997.

State surveys: Merrill, 1273.

U. S. Geological Survey: Inst. Govt. Research, 891.

Hogshooter gas sand, Oklahoma: Berger, 123.

Hoodoos, miniature: Schroeder, 1583.

Hornitos: Sapper, 1599.

Hudson submarine channel: Daly, 458.

Huronian. *See* Pre-Cambrian.

Hydrated ferric oxides: Posnjak, 1482.

Hydrocarbons.

Utah: Bardwell, 68.

Hydromagnesite.

British Columbia, Clinton district: Reinecke, 1537.

Hydrotalcite group: Foshag, 613.

Hydrozoa.

Cryptozoon: Rothpletz, 1582.

Serpulites, affinities: Price, 1494.

Ice, physical properties: Matsuyama, 1230.

Ice crystals, fossil: Udden, 1878.

Ice age. *See* Glacial geology.

Ice ages (ancient).

Alaska, southeastern, Paleozoic: Kirk, 1011.

Banded clays: Sayles, 1606.

Cobalt conglomerate, origin: Coleman, 382.

Till argillites, Pre-Cambrian, Permian, and Pleistocene: Lane, 1054.

Idaho.

General: Livingston, 1109.

State Bureau of Mines and Geology, report: Thompson, 1840.

Areas described.

Fort Hall Indian Reservation: Mansfield, 1211.

Pine Creek district: Jones, 944.

Seven Devils district: Livingston, 1111.

Yellow Pine cinnabar district: Larsen, 1059.

Economic geology.

Antimony: Thomson, 1839.

Boise Basin district: Ballard, 62.

Bunker Hill lode, Wardner: Rickard, 1551.

Cinnabar, near Black Pine: Larsen, 1057.

Clays: Skeels, 1711.

Coal, eastern Idaho: Mansfield, 1216.

Horseshoe district, Teton basin: Evans, 553.

Cobalt, Lemhi County: Hess, 803.

Copper, Seven Devils district: Livingston, 1111.

Gold, silver, copper, lead, and zinc: Gerry, 644, 646.

Gypsum: Stone, 1785.

I. X. L. copper prospect, Adams County: Bell, 116.

Manganese: Livingston, 1110.

Mineral resources: Bell, 115, 118.

Mining districts: Varley, 1906.

Mining industry, 1918, 1919: Bell, 117, 118.

Molybdenum: Livingston, 1110.

Oil shale: Condit, 395.

Quicksilver: Livingston, 1110.

Salt deposits: Phalen, 1469.

South central Idaho: Umpleby, 1893.

Tin: Livingston, 1110.

Tungsten: Livingston, 1110.

Yellow Pine cinnabar district: Larsen, 1059.

Historical geology.

Bozeman beds: Keyes, 998.

Coeur d'Alene district: Shannon, 1673.

Eastern Idaho: Mansfield, 1216.

South Central Idaho: Umpleby, 1893.

Triassic and Jurassic, southeastern Idaho: Mansfield, 1214.

Wasatch and Salt Lake formations, southeastern Idaho: Mansfield, 1213.

Mineralogy.

Anglesite, Coeur d'Alene district: Shannon, 1661, 1676.

Boulangerite, Mullan: Shannon, 1678.

Brannerite, Stanley Basin: Hess, 804.

Calcite, Pioneer district: Shannon, 1676.

Jamesonite containing silver, Owyhee County: Shannon, 1678.

Linarite and leadhillite, Wardner: Shannon, 1664.

Naumannite, Silver City district: Shannon, 1679.

Tetrahedrite, Pine Creek district: Shannon, 1676.

Idaho—Continued.

Petrology.

Coeur d'Alene district: Shannon, 1673.

Physical geology.

Rocky Mountain structure, southeastern Idaho: Mansfield, 1212.

Identification of geological formations: Udden, 1880.

Igneous and volcanic rocks. *See also* Intrusions; Magmas.

Alaska, Anvik-Andreafski region: Harrington, 751.

Chichagof Island, western part: Overbeck, 1411.

Kahiltna Valley: Mertie, 1282.

Kennecott: Bateman, 98.

Kiwalik-Koyuk region: Harrington, 755.

northern, Canning River region: Leffingwell, 1074.

Porcupine district: Eakin, 530.

Talkeetna Mountains, western: Capps, 293.

Tolstoi district: Harrington, 752.

Arizona, Ray-Miami region: Ransome, 1507.

Jerome district, Yavapai County: Reber, 1522.

Tucson and Amole Mountains: Jenkins, 901.

Belcher Islands, Hudson Bay: Moore, 1341.

British Columbia, Ainsworth district: Schofield, 1619.

Vancouver Island, East Sooke Peninsula: Cooke, 402.

California, San Diego County: Ellis, 542.

Sunset-Midway field: Pack, 1415.

Classification, quantitative mineralogical: Johannsen, 928.

Colorado, Platoro-Summitville district: Patton, 1454.

Routt and Moffat counties: Perini, 1461.

Routt County: Crawford, 416.

Twin Lakes district: Howell, 924.

Composition, texture, classification, description, and occurrence: Iddings, 885.

Costa Rica: Sears, 1642.

Density, calculation from norm: Iddings, 886.

Greenland: Böggild, 157.

Hawaiian Islands: Powers, 1486.

Illinois, Hardin County: Weller, 1973.

Idaho, Coeur d'Alene district: Shannon, 1673.

Fort Hall Indian Reservation: Mansfield, 1211.

Pine Creek district: Jones, 944.

Seven Devils district: Livingston, 1111.

south central: Umpleby, 1893.

Kansas, Riley County: Moore, 1350.

Maine, Mount Desert Island: Bascom, 87.

Manitoba, Cross-Pipestone area: Alcock, 13.

Knee Lake district: Bruce, 210.

northern: Bruce, 211.

Reed and Wekusko lakes region: Alcock, 10.

Maryland, Elkton quadrangle: Bascom, 86.

Massachusetts, Westfield, gabbroid diabase: Shannon, 1665.

Mexico, Guerrero: Bonillas, 166; Parades, 1442; Zumpango del Rio: Waitz, 1926.

Hidalgo, El Chico: Wittich, 2071.

Minnesota, Gunflint district: Broderick, 198.

Montana, Sweet Grass Hills: Kemp, 976.

New Brunswick, Burnthill Brook area: Young, 2097.

Newfoundland, southeastern: Buddington, 226.

New Mexico, Mogollon district: Scott, 1641.

northeastern: Garrett, 640.

Pecos Valley: Semmes, 1658.

Puertecito district: Wells, 1978.

Taos range: Gruner, 720.

New York, Adirondacks: Alling, 28.

Lake Clear region: Alling, 26.

Lewis County: Buddington, 225.

Ontario, Kirkland Lake area: Burrows, 246.

Matachewan district: Cooke, 401.

Michipicoten district: Collins, 390.

Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.

Oregon: Smith, 1728.

Igneous and volcanic rocks—Continued.

Porto Rico : Berkey, 124.

Coamo-Guayama district : Hodge, 837.

San Juan district : Semmes, 1655.

Quebec, Coleraine area : Knox, 1030.

Gaspe County, Lemieux : Mailhot, 1199; Mount Albert : Mailhot, 1200.

Harricanaw-Turgeon basin : Tanton, 1813.

northern : Cooke, 403.

Utah : Butler, 255.

Abajo Mountains : Thorpe, 1841.

Tintic district : Lindgren, 1105.

Vermont, Cuttingsville : Eggleston, 538.

central : Richardson, 1544.

Northfield : Richardson, 1545.

Roxbury : Richardson, 1546.

Washington, southwestern : Culver, 428.

Stevens County : Weaver, 1970.

Illinois.

Survey, administrative report, 1916-17 : DeWolf, 495.

Areas described.

Brown County : Nebel, 1367.

Colchester and Macomb quadrangles : Hinds, 832.

Goodhope and La Harpe quadrangles : Nebel, 1368.

Hardin County : Weller, 1973.

Hennepin quadrangle : Cady, 267.

La Salle quadrangle : Cady, 267.

Pike and Adams counties : Coryell, 410.

Economic geology.

Central eastern Illinois : Mylius, 1362.

Clay, Mountain Glen, Union County : St. Clair, 1592.

Coal, District V (Saline and Gallatin counties) : Cady, 268.

Hennepin quadrangle : Cady, 267.

La Salle quadrangle : Cady, 267.

low-sulphur : Cady, 267.

Gravel and limestone : DeWolf, 496.

Gravel deposits : Leighton, 1076.

La Salle district : Ede, 537.

Mineral industries, map : Christensen, 338.

Mineral resources : Barrett, 83.

Oil and gas prospecting, central eastern Illinois : Mylius, 1362.

Oil possibilities, Brown County : Nebel, 1367; Goodhope and La Harpe quadrangles : Nebel, 1368.

Petroleum : Barrett, 84.

Flat Rock pool, Crawford County : Tough, 1854.

Trenton field : DeWolf, 497.

Pyrite in coal beds : Cady, 269.

Staunton gas pool : Mylius, 1363.

Zinc : Boericke, 160.

Historical geology.

Chester series : Weller, 1974, 1975.

Devonian : Savage, 1604; southwestern Illinois : Savage, 1605.

Kinderhook group, western Illinois : Moore, 1343.

La Salle anticline : Cady, 270.

La Salle district : Ede, 537.

Loess deposits, Alton : Baker, 59.

New Richmond sandstone, northern Illinois : Cady, 266.

Northeastern Illinois : Anderson, 30.

Orchard Creek shale : Savage, 1602.

Pleistocene : Leighton, 1077.

Saline and Gallatin counties : Cady, 268.

Staunton gas pool : Mylius, 1363.

Thebes sandstone : Savage, 1602.

Mineralogy.

Mineral collections in State Museum : Crook, 418.

Paleontology.

Hardin County : Weller, 1973.

Loess deposits, Alton : Baker, 59.

Illinois—Continued.

Paleontology—Continued.

- Orchard Creek shale: Savage, 1602.
- Pleistocene Vertebrata: Hay, 768.
- Thebes sandstone: Savage, 1602.

Physical geology.

- Central eastern Illinois: Mylius, 1862.
- La Salle anticline: Cady, 270.

Physiographic geology.

- Chicago area: Salisbury, 1594.
- Illinois Valley: Cady, 265.
- Monk's Mound, St. Clair County: Crook, 417.
- Northeastern Illinois: Anderson, 30.
- Southern Illinois: Bonnell, 167.

Underground water.

- Artesian waters, northeastern Illinois: Anderson, 30.
- Independence shale, Brandon, Iowa: Thomas, 1833.

Indiana.

- Soils, Benton County: Jones, 950.
- Carroll County: Erni, 552.
- Cass County: Beals, 107.
- Whitley County: Shiltz, 1690.
- Survey, report: Barrett, 75, 80, 81; Logan, 1121.

Economic geology.

- Clay, indianate, Monroe County: Logan, 1117-1119.
- Coal, Monroe County: Logan, 1116.
- Vigo County: Logan, 1121.
- Coal seams, workable: Barrett, 82.
- Flints and cherts: Bennett, 121.
- Indianate, origin: Logan, 1118, 1119.
- Kaolin: Logan, 1119, 1121.
- Mineral resources: Logan, 1121.
- Molding sand: Hole, 846.
- Natural gas: Wright, 2082.
- Oil and gas fields: Barrett, 79; Wright, 2081.
- Oil shales: Reeves, 1527.
- Petroleum: Bownocker, 184.
- Petroleum and natural gas: Logan, 1120.
- Pyrite in coals: Barrett, 82.
- Sullivan County oil field: Visser, 1920.

Historical geology.

- Chester formations, Orange County: Hole, 846.
- Chester series, southern Indiana: Malott, 1200.
- General: Logan, 1120.
- Greene County, eastern: Malott, 1205.
- Ordovician, Madison: McEwan, 1174.
- Saluda limestone, Madison: Sulzer, 1800.

Paleontology.

- Chester formations, Orange County: Hole, 846.
- Ordovician, Madison: McEwan, 1174.
- Pleistocene Mollusca: Baker, 57.

Physical geology.

- Laurel limestone, erosion forms: Sulzer, 1801.
- Structural geology: Barrett, 79.

Physiographic geology.

- Anderson esker: Reeves, 1526.
- Dunes, northwestern Indiana: Barrett, 76.
- Greene County, eastern: Malott, 1205.
- Knobstone region, southern Indiana: Malott, 1207.
- McCormicks Creek: Barrett, 78.
- Shades: Barrett, 77.

Indianate, origin: Logan, 1118, 1119.

Inequalities of sedimentation: Kindle, 1065.

Insects.

- Culex winchesteri, Cathedral Bluffs, Colorado: Cockerell, 367.
- Eocene, Rocky Mountains: Cockerell, 363.
- Florida, Vero, beetles: Wickham, 2023.
- Hymenoptera, parasitic, Florissant: Cockerell, 368.

Internationalization of mineral resources: Leith, 1079.

Intrusions. *See also* Dikes.

New Mexico, Pecos Valley: Semmes, 1658.

Invertebrates (general). *See also the classes of invertebrates.*

California Academy of Sciences, report of curator: Hanna, 743.

Cannonball fauna: Stanton, 1756.

Devonian, western Tennessee: Dunbar, 526.

Illinois, Orchard Creek shale: Savage, 1602.

Thebes sandstone: Savage, 1602.

Iowa, Fort Dodge, Ste. Genevieve marls: Lees, 1073.

Mexico, Coahuila, Permian: Haack, 724.

Missouri, Kimmswick and Platin limestones: Foerste, 603.

New York, Martinsburg, Trenton fauna: Clark, 345.

Vernon shale fauna: Ruedemann, 1586.

Portage fauna, Mackenzie River valley: Kindle, 1006.

Pottsville invertebrates, Webster County, West Virginia: Price, 1492.

Report of Museum of Comparative Zoology: Raymond, 1521.

Silurian, Ohio: Foerste, 599.

Southwestern Ontario: Williams, 2034.

Texas, Fredericksburg and Washita formations: Adkins, 7.

Weno and Paypaw formations: Adkins, 6.

Utah, Carboniferous and Triassic: Girty, 661.

West Virginia, Webster County: Price, 1492.

Iowa.

History of Iowa geology: Keyes, 997.

State geologist's report: Kay, 960.

Areas described.

Adair County: Gow, 679.

Cass County: Tilton, 1847.

Clarke County: Tilton, 1846.

Ringgold County: Arey, 35.

Taylor County: Arey, 36.

Economic geology.

Gypsum: Stone, 1785.

Mineral Production, 1916: Kay, 961.

Historical geology.

Aftonian gravels, Union County: Kay, 964.

Boring, Laurens, Pocahontas County: Cable, 264.

Fort Dodge gypsum: Lees, 1072.

Gravel deposits, Louisa and Washington counties: Schoewe, 1615.

Hackberry stage, Devonian: Fenton, 580.

Independence shale, Brandon: Thomas, 1835.

Preglacial Moingona River: Keyes, 984.

Ste. Genevieve marls, Fort Dodge: Lees, 1073.

Southwestern Iowa: Smith, 1714.

Wapsipinicon breccias: Norton, 1381.

Wisconsin drift, relation to Iowan drift in Worth County: Cable, 262.

Mineralogy.

Meteorites, Amana: Prior, 1497.

Estherville: Merrill, 1276.

Paleontology.

Echinodermata, Devonian: Thomas, 1832.

Hackberry stage, Devonian: Fenton, 580.

Helicina occulta: Shimek, 1691.

Herpetocrinus, Monticello, Iowa: Thomas, 1834.

Ste. Genevieve marls, Fort Dodge: Lees, 1073.

Southwestern Iowa: Smith, 1714.

Petrology.

Dolomites, composition: Reed, 1523.

Physical geology.

Gumbotil, origin: Kay, 963.

Thurman-Wilson fault, southwestern Iowa: Tilton, 1845.

Physiographic geology.

Aftonian gravels, Union County: Kay, 964.

Boulders in Kansan drift: Kay, 962.

Boyer Valley: Lees, 1070.

Camp Dodge region, Iowa: Lees, 1069.

Iowa—Continued.

Physiographic geology—Continued.

- Des Moines valley: Lees, 1071.
 Drift deposits, Des Moines: Keyes, 996.
 Gravel deposits, Louisa and Washington counties: Schoewe, 1615.
 Gumbotil: Kay, 963.
 Iowan-Wisconsin border: Cable, 263.
 Preglacial Moingona River: Keyes, 984.

Underground water.

- Clarke County: Tilton, 1846.

Iowan-Wisconsin border, Iowa: Cable, 263.

Iron: Burchard, 231, 233; Harder, 748.

- Arizona, Eureka district, magmatic ore: Ball, 60.
 Bacteria and iron deposition: Harder, 745, 747.
 Belcher Islands, Hudson Bay: Moore, 1341.
 British Columbia, Taseko Valley: Brewer, 194.
 Canada, Arctic regions: Moore, 1342.
 titaniferous ores: Goodwin, 673.
 Chrome iron ore, occurrences: Ross, 1580.
 Cuba: Weld, 1972; Santiago: Kimball, 1002.
 Gogebic Range: Hotchkiss, 865.
 Illinois, Hardin County: Weller, 1973.
 Kentucky: Miller, 1293.
 Lake Superior region: Crowell & Murray, 427; Winchell, 2058.
 Mackenzie: Kindle, 1008.

- Magnetite and hematite, relations: Broderick, 196.

- Mexico, Hidalgo: Paredes, 1443.

- Minnesota, Gunflint district: Broderick, 198.

- Mesabi range: Grout, 716; Wolff, 2074.

- Montana, Stanford hematite district: Westgate, 1985.

- New York, Clinton County: Miller, 1307; Newland, 1374.

- Nova Scotia, sedimentary ores: Hayes, 774.

- Origin: Eng. M. J., 551.

- Ontario: O'Connor, 1386.

- Michipicoten district: Collins, 390, 391.

- Porto Rico, Mayaguez, limonite: Fettke, 589.

- Quebec, Belcher Islands, Hudson Bay: Moore, 1341.

- Texas, eastern: Dumble, 524.

- Wisconsin, Gogebic Range: Hotchkiss, 867.

Isostasy.

- General: Barrell, 72, 73; Brown, 204; Willis, 2049.

- Glaciation and deglaciation: Daly, 458.

- Labrador ice sheet, relations to isostasy: Coleman, 380.

- Mathematics: Chamberlin, 323; MacMillan, 1193.

- Rocky Mountains: Keyes, 995.

- Jack Bay district, Prince William Sound, Alaska: Johnson, 930.

Jamaica.

Physical geology.

- Earthquakes: Taber, 1806.

- Joints, mechanical interpretation: Bucher, 223.

- Jurassic. *See also* Paleontology, Jurassic.

- Alaska, northern, Canning River region: Leffingwell, 1074.

- Talkeetna Mountains, western: Capps, 293.

- Alberta, Crowsnest coal field, northern part: Rose, 1575.

- British Columbia, Ainsworth district: Schofield, 1619.

- Hazleton: O'Neill, 1390.

- Selkirk Range: Schofield, 1621.

- Slocan area: Baneroff, 66.

- Vancouver Island, Barkley Sound: Dolmage, 506.

- California, Santa Barbara County, Santa Ynez River district: Kew, 980.

- Colorado, Montezuma County, McElmo anticline: Coffin, 375.

- Cuba: O'Connell, 1385.

- Oxfordian, western Cuba: Brown, 203.

- Greenland: Büggild, 157.

- Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

- southeastern: Mansfield, 1214.

- Mesozoic floras of North and South America: Knowlton, 1026.

Jurassic—Continued.

- Montana, Fergus County: Freeman, 622.
 New Mexico: Keyes, 993; Lee, 1068; northeastern: Garrett, 640.
 North America, southern: Stanton, 1754.
 Oregon: Smith, 1728.
 Utah: Butler, 255; Dake, 443; southeastern: Forrester, 611.
 Wyoming, Lance Creek field: Hancock, 737.
 Maverick Springs: Collier, 389.

Kansas.

Areas described.

- Syracuse and Lakin quadrangles: Darton, 462.

Economic geology.

- Elk City gas field: Boughton, 170.
 Granite ridge, buried, relation to oil fields: Moore, 1351.
 Gypsum: Stone, 1785.
 Mid-Continent oil fields: Bosworth, 169.
 Natural gas: Snider, 1736.
 Natural gases, chemical survey: Allen, 21.
 Oil and gas, Allen and Neosho counties: Moore, 1347.
 Wilson and Montgomery counties: Moore, 1348.
 Oil and gas fields, map: U. S. Geol. Survey, 1895.
 Oil domes, central Kansas, origin: Blackwelder, 153.
 Petroleum: Moore, 1349; Snider, 1736.
 Salt deposits: Phalen, 1469.

Historical geology.

- Allen and Neosho counties: Moore, 1347.
 Comanchean and Dakota strata: Twenhofel, 1871.
 Cretaceous: Twenhofel, 1872.
 Eastern Kansas: Fath, 575.
 Elk City gas field: Boughton, 170.
 General: Moore, 1346; Snider, 1736.
 Granite boulders, southeastern Kansas: Twenhofel, 1868.
 Granite ridge: Fath, 575; Moore, 1351.
 Wilson and Montgomery counties: Moore, 1348.
 Wrexford and Foraker limestones: Twenhofel, 1867.

Paleontology.

- Algal deposits, Carboniferous: Twenhofel, 1869.

Petrology.

- Igneous rock, Riley County: Moore, 1350.

Underground water.

- Syracuse and Lakin quadrangles: Darton, 462.

Kahlitna Valley, Alaska: Mertie, 1282.

Kantishna region, Alaska: Capps, 291.

Kaolin.

- Indiana: Logan, 1119, 1121.
 North Carolina: Bayley, 104.
 Quebec, Amherst township: Wilson, 2051.

Kentucky.

- Geology: Miller, 1293.

Areas described.

- Allen County: Miller, 1297; Shaw, 1680.
 Barren County: Butts, 259.

Economic geology.

- Bibliography of petroleum, natural gas, asphalt, and oil shale: Jillson, 908.
 Coal: Jillson, 922.
 bibliography: Jillson, 915.
 Clay County: Hodge, 840.
 Clay County, Sexton Creek area: Russell, 1589.
 Goose Creek region: Hodge, 840.
 Kentucky River, north fork: Hodge, 839.
 Leslie and Harlan counties: Hodge, 838.
 Magoffin County: Browning, 206.
 production: Jillson, 916.
 Stinking Creek area: Jillson, 904.
 Coals, low sulphur: Jillson, 912.
 Eastern Kentucky: Jillson, 918.

Kentucky—Continued.

Economic geology—Continued.

Geologic map: Jillson, 920.

Glass sands: Richardson, 1547.

Irvine oil district: St. Clair, 1591.

Natural gas, eastern Kentucky: Jillson, 907.

Oil and gas: Jillson, 922, 924.

Allen County: Jillson, 913.

Barren County: Butts, 259.

Breathitt and Knox counties: Jillson, 914.

Warren County: Jillson, 919.

Oil and gas industry, development: Jillson, 906.

Oil and gas resources: Jillson, 903.

Oil fields: Glenn, 663; Leonard, 1085.

Oil shales, Estill County: Crouse, 426.

Petroleum, Allen County: Miller, 1297; Shaw, 1680.

pay oil sands, eastern Kentucky: Jillson, 918.

southeastern Kentucky: Jillson, 910.

Wier sand horizon: Jillson, 917.

Paint Creek uplift, Johnson County: Jillson, 925; Rhodes, 1541.

Stinking Creek region: Jillson, 904.

Warren County: Jillson, 919.

Historical geology.

Allen County: Jillson, 913; Shaw, 1680.

Breathitt and Knox counties: Jillson, 914.

Geologic map: Jillson, 920.

Irvine district: St. Clair, 1591.

Kendrick shale: Jillson, 911.

Magoffin County: Browning, 206.

Mauch Chunk, southeastern Kentucky: Jillson, 910.

Paint Creek uplift, Johnson County: Jillson, 925; Rhodes, 1541.

Stinking Creek region: Jillson, 904.

Warren County: Jillson, 919; Laird, 1047.

Mineralogy.

Meteorites, Cumberland Falls, Whitley County: Merrill, 1272, 1275; Miller, 1294, 1296, 1298.

Eagle station: Prior, 1497.

McCreary County: Miller, 1295.

Paleontology.

Coal measures invertebrates, eastern Kentucky: Jillson, 921.

Kendrick shale: Jillson, 911.

Physical geology.

Eastern Kentucky, structural deformation: Jillson, 909.

Physiographic geology.

Migration of divide, Floyd County: Jillson, 905.

Stream capture, Floyd County: Jillson, 905.

Kimmswick and Plattin limestones, Missouri: Foerste, 603.

Kirkland Lake gold area, Ontario: Burrows, 246.

Kiwalik-Koyuk region, Alaska: Harrington, 755.

Knee Lake district, northeastern Manitoba: Bruce, 210.

Kodiak Island, Alaska: Maddren, 1198.

Labrador ice sheet, extent and thickness: Coleman, 380.

Lake Athabasca, origin: Alcock, 15.

Lakes, glacial. *See* Glacial lakes.Lamellibranchiata. *See* Pelecypoda.

Landslides.

Alaska, Katmai district, Mageik landslide: Griggs, 713.

Colorado, Platoro-Summitville district: Patton, 1454.

Quebec, Portneuf County: Wilson, 2052.

West Virginia, Morgantown, Conemaugh formation: Scheffel, 1612.

Larder Lake gold area, Ontario: Hopkins, 855.

Lava.

Columnar structure in lavas: James, 897.

Hornitos: Sapper, 1599.

Oxidation by steam: Ferguson, 585.

Lead: Siebenthal, 1699, 1701.

Alaska: Martin, 1220.

Arizona: Heikes, 784, 786.

British Columbia, Ainsworth district: Schofield, 1619.

California: Yale, 2093, 2095.

Central States: Dunlop, 527.

Colorado: Heikes, 790; Henderson, 793.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Pine Creek district: Jones, 944.

Wardner district: Rickard, 1551.

Montana: Gerry, 645; Heikes, 783.

Nevada: Heikes, 782, 785.

New Mexico: Henderson, 789, 792.

Quebec, Gaspé Peninsula: Mailhiot, 1203.

Gaspesia: Beidelman, 112.

Oregon: Yale, 2093, 2095.

Rapid formation of lead ore: Wheeler, 1991.

South Dakota: Henderson, 788, 791.

Texas: Henderson, 789, 792.

Utah: Butler, 255; Heikes, 781, 787.

East Tintic district: Goodwin, 672.

Tintic district: Lindgren, 1105.

Washington: Gerry, 644, 646.

Wyoming: Henderson, 788.

Yukon. Twelvemile area: Cockfield, 371.

Leeward Islands.

Paleontology.

Tertiary Mollusca: Cooke, 398.

Lignite: Darling, 460. *See also* Coal.

Alaska, Kantishna region: Capps, 291.

Saskatchewan: MacLean, 1186.

South Dakota: O'Harra, 1387.

Texas: Gentry, 642; eastern: Dumble, 524.

Lime: Loughlin, 1131, 1134.

Limestone.

Vermont: Jacobs, 893.

Lithium: Insley, 890.

Lithology. *See* Petrology.

Lithosphere, structure: Willis, 2049.

Loess.

Illinois, Alton: Baker, 59.

Loess fossils: Shimek, 1691.

Logmeter: Burton, 247.

Louisiana.

Economic geology.

Gypsum: Stone, 1795.

Natural gas: Snider, 1736.

Petroleum: Snider, 1736.

Red River field: Bates, 100.

Red River-Crichton oil field: Bates, 100.

Sabine uplift: Powers, 1493.

Salt deposits: Phalen, 1469.

Salt dome structure: Lucas, 1141.

Salt domes: Wolf, 2072.

Historical geology.

De Soto-Red River oil field: Bates, 100.

Port Hudson beds: Emerson, 549.

Red River-Crichton oil field: Bates, 100.

Sabine uplift: Powers, 1493.

Lower Silurian. *See* Ordovician.

Mackenzie.

Economic geology.

Iron, Mackenzie River valley: Kindle, 1008.

Mackenzie River basin: Camsell, 281; Thompson, 1838.

Historical geology.

Athabaska series: Alcock, 14.

Mackenzie—Continued.

Paleontology.

Portage fauna, Mackenzie River valley: Kindle, 1006.

Magmas. *See also* Intrusions.

Crystallization-differentiation: Bowen, 174, 180.

Deformation of crystallizing magma: Bowen, 178.

Differentiation by deformation: Bowen, 179.

Duluth gabbro, basal phases: Nebel, 1369.

Duluth lopolith: Bowen, 174.

Movements in crystallizing magmas: Grout, 719.

Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks:

Benson, 122.

Magmatic differentiation.

British Columbia, Vancouver Island, East Sooke Peninsula: Cooke, 402.

Magnesite: Dolman, 509; Stone, 1776; Yale, 2094.

British Columbia, Lillooet-Prince George region: Reinecke, 1538.

United States: Phalen, 1470.

Washington, Stevens County: Dolman, 509; Handy, 747; Weaver, 1970.

Magnesium: Stone, 1778, 1793.

Magnetite and hematite, relations: Broderick, 196.

Maine.

Historical geology.

Mount Desert Island: Bascom, 87.

Portsmouth basin: Wandke, 1943.

Mineralogy.

Calcium phosphate mineral, Stoneham: Holden, 844.

Physiographic geology.

Champlain submergence, depth along coast: Meserve, 1289.

Mount Desert Island: Bascom, 87.

Postglacial uplift: Fairchild, 562.

Underground water.

Flowing well, Winslow: Little, 1108.

Mammalia.

Antilean, affinities and origin: Matthew, 1235.

Arctotherium, Texas: Matthew, 1243.

Artiodactyls: Lull, 1146.

Blastomeryx: Lull, 1147.

California, Mohave Desert: Merriam, 1264.

southern coast ranges: Stock, 1770.

Diceratheres: Peterson, 1468.

Edentata, Cenozoic history: Stock, 1768.

Wasatch and Wind River beds: Matthew, 1237.

Entelodonts: Troxell, 1863, 1865.

Equidae, Oligocene: Buwalda, 261.

Felidae, White River beds: Thorpe, 1842.

Florida, Pleistocene: Hay, 764.

Gires, Wasatch and Wind River beds: Matthew, 1237.

Hypisodus: Troxell, 1864.

Insectivora, Wasatch and Wind River beds: Matthew, 1237.

Mastodon, ancestry: Osborn, 1405.

Gratiot County, Michigan: MacCurdy, 1169.

Moropus, habits: Osborn, 1404.

Mylodon harlani, mounted skeleton: Stock, 1772.

Nebraska, western, Pleistocene: Matthew, 1236.

New York, Orange County, Monroe: Clarke, 358.

Notharctus, Eocene primate: Gregory, 706.

Oreodontidae: Loomis, 1124.

Paleomastodon: Osborn, 1405.

Peccaries, Maryland, Pleistocene: Gidley, 649.

Primitive foot: Gidley, 648.

Princeton museum mounts: Sinclair, 1707.

Proboscidea, New York: Hay, 766.

Reptilian characters in mammals: Wortman, 2080.

Snake Creek fauna: Matthew, 1236.

South Dakota, Black Hills region: O'Harra, 1389.

Tertiary artiodactyls: Lull, 1147.

Mammalia—Continued.

- Ticholeptus rusticus*: Loomis, 1124.
 Uinta Basin, Eocene: Peterson, 1467.
 Ungulata, preorbital fossae: Gregory, 708.
 Wasatch and Wind River faunas: Matthew, 1237.

Man, fossil.

- Evolution: Matthew, 1247; Osborn, 1409.
 Florida, Vero: Hrdlička, 875; Sellards, 1645; Sterns, 1763.
 Origin: Merriam, 1265.
 Social evolution: Matthew, 1245.
 Trenton gravels, New Jersey: Wright, 2087.
 Manganese: Harder, 746; Hewett, 808, 809, 810, 812.
 Appalachian Valley, Virginia and Tennessee: Stose, 1789.
 Arkansas, Batesville district: Miser, 1316, 1320.
 Arizona: Jones, 946.
 Bibliography: Hewett, 810; Wheeler, 1988.
 California, southeastern: Jones, 947.
 Canada: Mackenzie, 1181.
 Colorado: Jones, 948; Mullenburg, 1355.
 Colorado River desert region: Jones, 949.
 Costa Rica: Sears, 1642.
 Cuba: Burch, 228, 229; Burchard, 237, 238.
 Georgia: Hull, 878.
 Idaho: Livingston, 1110.
 Nevada: Pardee, 1441.
 New Mexico: Jones, 945; Wells, 1977.
 New York, Columbia County, postglacial: Dale, 447.
 Northwestern States: Pardee, 1440.
 Nova Scotia: Hayes, 771; western: Faribault, 571.
 Panama, Boqueron River: Sears, 1643.
 Southern States: Stose, 1792.
 Tennessee: Crane, 415.
 Virginia, Blue Ridge, west foot: Stose, 1786.

Manitoba.

Areas described.

- Athapapuskow Lake district: Bruce, 207.
 Cross-Pipestone area: Alcock, 13.
 Knee Lake district: Bruce, 210.
 Reed and Wekusko lakes region: Alcock, 10.
 Reed-File lakes area: Alcock, 11.
 Reed Lake-Elbow Lake: Bruce, 208.
 Wekusko Lake area: Alcock, 12.

Economic geology.

- Chalcopyrite deposits, northern Manitoba: Bruce, 211.
 Copper Lake gold district: Wallace, 1941.
 Falcon Lake district: De Lury, 489.
 Knee Lake district, northern Manitoba: Anon., 2108.
 Maskwa River norite: Colony, 393.
 Northern Manitoba: Wallace, 1939, 1940, 1942.
 Schist Lake region, Mandy mine: Hanson, 744.
 Southeastern Manitoba: Bruce, 209.
 Sulphide deposits, northern Manitoba: Hanson, 744.
 The Pas mineral district: Wallace, 1939.
 Tin, West Hawk Lake region: DeLury, 490.

Historical geology.

- Borings: Dowling, 515.
 Correlation: Dowling, 514.
 Falcon Lake district: DeLury, 489.
 Hudson Bay region: Savage, 1603.
 Northern Manitoba: Bruce, 211; Hanson, 744.
 Rice Lake, Maskwa River, and Boundary districts: DeLury, 488.
 Southern Manitoba: DeLury, 488.

Petrology.

- Maskwa River norite: Colony, 393.

Physiographic geology.

- Pleistocene changes of level: Johnston, 943.
 Winnipegosis area, surface deposits: Johnston, 942.

Maps. *See* Geologic maps; Relief maps.

Map making. *See* Cartography.

Marble: Burchard, 236.

Alaska, southeastern: Burchard, 236.

Vermont, Roxbury: Richardson, 1546.

Maryland.

Economic geology.

Chromite deposits: Diller, 500; Lewis, 1096; Singewald, 1708, 1769.

Talc, Harford County: Diller, 504.

Historical geology.

Cambrian: Bassler, 90.

Coal measures: Swartz, 1804.

Cretaceous, Federal Hill, Baltimore: Berry, 141.

Elkton quadrangle: Bascom, 86.

Newark system: Dorsey, 519.

Ordovician: Bassler, 90.

Paleontology.

Cambrian: Bassler, 90.

Cantheliophorus, Carboniferous: Bassler, 89.

Coal measures: Swartz, 1804.

Cretaceous, Federal Hill, Baltimore: Berry, 141.

Dinosaur, ornithomimid, Arundel formation: Gilmore, 657.

Ordovician: Bassler, 90.

Pleistocene, peccaries, Cumberland: Gidley, 649.

Vertebrata: Hay, 768.

Petrology.

Elkton quadrangle: Bascom, 86.

Maskwa River norite, Manitoba: Colony, 393.

Massachusetts.

Historical geology.

Dighton conglomerate, origin: Perkins, 1462.

Silurian, Essex County: Foerste, 605.

Unconformity between Berkshire schist and Stockbridge limestone, Adams: Dale, 449.

Mineralogy.

Amesite, Chester: Shannon, 1667, 1675.

Chester emery mine: Shannon, 1663.

Bucholzite, Blandford: Shannon, 1676.

Corundophillite, Chester: Shannon, 1675.

Gedrite, Chesterfield: Shannon, 1676.

Monazite, Weymouth: Palache, 1426.

Pelham asbestos mine: Shannon, 1662.

Westfield, datolite locality: Shannon, 1660.

diabantite: Shannon, 1672.

Paleontology.

Footprint, Attleboro: Lull, 1148.

Mollusca, Boston Basin boulder clay: Morse, 1353.

Petrology.

Gabbroid diabase in Westfield: Shannon, 1665.

Physiographic geology.

Camp Devens area: Atwood, 46.

Cape Cod region: Brigham, 195.

Postglacial uplift: Fairchild, 562.

Matatchewan district, northern Ontario: Burrows, 244; Cooke, 401.

Matanuska coal fields, Alaska: Martin, 1219.

Maverick Springs, Fremont County, Wyoming: Collier, 389.

Mayo area, Yukon: Cockfield, 370, 373.

Measurement of folded beds: Hewett, 813.

Mechanics of geologic structures: Mead, 1252.

Mechanics of vein formation: Taber, 1805.

Meetings. *See* Associations.

Mercury. *See* Quicksilver.

Mesozoic (undifferentiated).

Alaska, Chichagof Island, western part: Overbeck, 1411.

Jack Bay district: Johnson, 930.

Kahiltna Valley: Mertie, 1282.

Tolstol district: Harrington, 752.

Arctic regions, Ellesmere Land: Holtedahl, 850.

Mesozoic (undifferentiated)—Continued.

British Columbia, Nickel Plate mountain: Schofield, 1620.

Washington, Stevens County: Weaver, 1970.

Metamorphic rocks, feldspar method of determining: Carlson, 295.

Metamorphism.

California, Riverside County, Crestmore: Eakle, 531.

Duluth gabbro, basal phases: Nebel, 1369.

New York, Lewis County: Buddington, 225.

Tactite: Hess, 849.

Utah, Tintic district: Lindgren, 1105.

Meteor Mountain, Arizona: Boot, 168.

Meteorites.

Amana, Iowa: Prior, 1497.

Chondrules and chondritic structure: Merrill, 1277.

Composition and structure: Merrill, 1268, 1271.

Copper in a meteorite vein: Quirke, 1504.

Cumberland Falls, Kentucky: Merrill, 1272, 1275; Miller, 1294, 1296, 1298.

Eagle Station, Kentucky: Prior, 1497.

Estherville, Iowa: Merrill, 1276.

Etching iron meteorites: Farrington, 574.

Kansas City, Missouri: Merrill, 1270.

McCreary County, Kentucky: Miller, 1295.

Percentage number of falls with reference to varying basicity: Merrill, 1269.

Richardton, North Dakota: Quirke, 1502, 1503, 1504.

Sundry meteorites: Merrill, 1271.

Mexico.

Instituto Geológico Nacional: Paredes, 1445.

Islands: Muñoz Lumbier, 1360.

Economic geology.

Coal and graphite, Sonora: Paredes, 1447.

Copper, Sonora: Tovote, 1855.

Cuyutlan area, Colima: Paredes, 1444.

Durango: Zubiría y Campa, 2003.

El Chico, Hidalgo: Wittich, 2071.

El Tigre district, Sonora: Mishler, 1321.

Fluorite, Guadalcázar, San Luis Potosí: Wittich, 2067.

Guadalcázar, San Luis Potosí: Wittich, 2066.

Iron, Hidalgo: Paredes, 1443.

Nacozari district, Sonora, Pilares mine: Wade, 1923.

Ore deposits: Lewis, 1100.

Petroleum: Iglesias, 888; Shaw, 1682.

indications, Pacific coast: Aguilar, 8.

islands in Gulf of California: Paredes, 1446.

southern Tamaulipas: Ordoñez, 1396, 1397.

submarine deposits: Urbina, 1898.

Puerto de Nieto, Guanajuato: Galvez, 635.

Quicksilver and gold placers, Guadalcázar, San Luis Potosí: Wittich, 2069.

Sonora, Arizpe district, Las Chipas mine: Montijo, 1329.

mineralized areas: Mitchell, 1324.

ore deposits: Tovote, 1856.

Sulphides, relation to water level: Lucke, 1143.

Sulphur, San Luis Potosí: Wittich, 2068.

Historical geology.

Cretaceous, Zumpango, Guerrero: Burckhardt, 240.

Deyonlan, Coahuila: Haack, 724.

El Chico, Hidalgo: Wittich, 2071.

El Tigre district, Sonora: Mishler, 1321.

General, Lewis, 11000.

Guadalcázar, San Luis Potosí: Wittich, 2066.

Guerrero: Paredes, 1442.

Mesozoic history: Stanton, 1754.

Nacozari district, Sonora: Wade, 1923.

Permian, Coahuila: Haack, 724.

Puerto de Nieto, Guanajuato: Galvez, 635.

Tamaulipas, southern: Ordoñez, 1397.

Tepexi, Puebla: Díaz Lozano, 499.

Valle de Toxi, Ixtlahuaca: Díaz Lozano, 498.

Mexico—Continued.

Mineralogy.

Cocinerite, Ramos, San Luis Potosi: Hough, 868.

Paleontology.

Cretaceous, Zumpango, Guerrero: Burckhardt, 240.

Devonian, Coahuila: Haack, 724.

Diatoms, Valle de Toxi, Ixtlahuaca: Díaz Lozano, 498.

Jurassic, Symon, Zacatecas: Burckhardt, 240.

Permian, Coahuila: Haack, 724.

Turonian ammonite fauna, Mexico: Böse, 164.

Petrology.

Guerrero: Bonillas, 166; Zumpango del Rio: Walitz, 1926.

Physical geology.

Caves in lava, Pedregal: Wittich, 2063.

Coast elevation, Lower California: Wittich, 2070.

Desert phenomena, San Luis Potosi: Wittich, 2064.

Earthquakes: Muñoz Lumbier, 1359.

Guadajara, 1912: Waitz, 1925.

Sonora, 1887: Aguilera, 9.

Seismology in Mexico: Muñoz Lumbier, 1359.

Volcanoes: Waitz, 1927.

Volcanic phenomena, Pedregal de San Angel: Wittich, 2065.

Physiographic geology.

Hornitos, Jorullo: Sapper, 1599.

Underground water.

Hidalgo, Tlanalapan: Camacho, 275.

Puebla: Valsequillo: Camacho, 276.

Tepehi, Puebla: Díaz Lozano, 499.

Mica: Schaller, 1610.

Michigan.

Economic geology.

Copper, Lake Superior region: Lang, 1056; Spurr, 1751.

native, Nonesuch formation: Nishio, 1375.

Copper district: Guck, 721; porphyry intrusions: Lang, 1055; Woods, 2077.

Gypsum: Stone, 1785.

Iron, Gogebic Range: Hotchkiss, 865.

Lake Superior region: Winchell, 2058.

Mineral resources: Allen, 24.

Salt deposits: Phalen, 1469.

Silver, native, Nonesuch formation: Nishio, 1375.

Historical geology.

Gogebic Range: Hotchkiss, 865.

Huronian formations, correlation: Allen, 25; Lane, 1053.

Racine formation, Northern Peninsula: Ehlers, 541.

Paleontology.

Algal deposits, Huronian: Twenhofel, 1869.

Heterolasma, Silurian, Mackinac County: Ehlers, 540.

Mastodon, Gratiot County: MacCurdy, 1169.

Physical geology.

Erosion, Seul Choix Point Peninsula: Ehlers, 539.

Singing sands, Lake Michigan: Richardson, 1548.

Physiographic geology.

Camp Custer area: Leverett, 1089.

Kalamazoo area: Leverett, 1093.

Shore lines, Elsie and Perrinton quadrangles: Leverett, 1090.

Michipicoten district, Ontario: Collins, 390.

Migration of geosynclines: Grabau, 680.

Military geology.

Engineering geology in and after the war: Berkey, 125.

General: Bennett, 120; Brooks, 202; Bryan, 217.

Geology, use for military purposes: Vaughan, 1912.

Geology in the Students' Army Training Corps: Gregory, 702.

Military and geologic mapping: Bateman, 96.

Military contribution of civilian engineers: Smith, 1718.

War work by department of geology, University of Oregon: Smith, 1731.

Mineral analyses. *See list*, p. 242.

Mineral deposits: Lindgren, 1104.

Mineral industry of Utah: Lewis, 1097.

Mineral paints.

Georgia, Cartersville, ocher deposits: Haney, 740.

Mineral supplies, United States: McCaskey, 1160.

Mineral water: Ellis, 543, 544.

Colorado: George, 643.

Mineralogy (general). *For regional see names of States. For particular minerals see list, p. 242. See also Crystallography; Meteorites; Technique.*

Åkermanite-gehlinite: Ferguson, 586.

Allanite, composition: Watson, 1965.

Anthophyllite, optical properties: Bowen, 181.

Crystal structures of calcites: Wyckoff, 2091.

Crystal types, relation to modes of occurrence: Tarr, 1820.

Becke reaction: McCaughey, 1164.

Beryl crystal, Black Hills: Waldschmidt, 1933.

Bindhelmite as an ore mineral: Shannon, 1668.

Determination of ore minerals: Davy, 475.

Goniometer, two-circle: Bascom, 88; Palache, 1417.

Hematite and rutile: Merwin, 1286.

Hexagonal and trigonal minerals: Wherry, 1999.

Hydrated ferric oxides: Posnjak, 1482.

Hydrotalcite group: Foshag, 613.

Iron hydroxide minerals: Merwin, 1285.

Isometric minerals: Wherry, 1997.

Isomorphous siderite and calcite: Johnson, 935.

Melanterite and chalcantite minerals: Larsen, 1060.

Mineralogical laboratory, University of Michigan: Kraus, 1034.

Monoclinic minerals: Wherry, 2002.

Orthorhombic minerals: Wherry, 2001.

Planchette and shattuckite: Schaller, 1608.

Preparing specimens: Levison, 1094.

Sulphate minerals in ore deposits: Butler, 254.

Sulphide minerals, nomenclature and classification: Wherry, 2000.

Sundry minerals described: Ford, 608, 609.

Tetragonal minerals: Wherry, 1998.

Textbook: Kraus, 1035.

Torbenite, abnormal birefringence: Bowen, 175.

Triclinic minerals, list: Wherry, 2003.

Vein quartz, microscopic study: Adams, 5.

Miniature hoodoos: Schroeder, 1624.

Minnesota.

Bibliography: Gregory, 710.

Areas described.

Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.

Economic geology.

Clay: Grout, 714.

Biwabik iron-bearing formation, east Mesabi district: Broderick, 197; nature and origin: Grout, 718.

Iron, Gunflint district: Broderick, 198.

Mesabi range: Wolff, 2074.

Lake Superior region: Winchell, 2058.

Magnetite deposits, East Mesabi range: Grout, 716.

Peat: Soper, 1739.

Shale: Grout, 714.

Historical geology.

East Mesabi range: Grout, 716.

General: Grout, 715.

Gunflint iron district: Broderick, 198.

Surface formations: Leverett, 1092.

Paleontology.

Organic structures, Biwabik iron-bearing formation: Grout, 717.

Petrology.

Duluth gabbro, basal phases: Nebel, 1369.

Duluth lopolith: Bowen, 174.

East Mesabi range: Grout, 716.

Minnesota—Continued.

Physiographic geology.

South half of Minnesota : Leverett, 1092.

Miocene. *See* Tertiary.

Miscellaneous. *See also* Addresses.

Agricultural geology : Smith, 1723.

Engineering geology in and after the war : Berkey, 125.

Geologists as expert witnesses : Ransome, 1511.

Geologists as witnesses in mining litigation : Leith, 1081.

Geology as a basis of citizenship : Pogue, 1476.

Geology as a synthetic science : Smith, 1730.

Geology in the law : Kemp, 973.

Geology in the Students' Army Training Corps : Gregory, 702.

Investigation versus propagandism : Chamberlin, 318.

Outlook for geology : DeWolf, 494.

Place of modern languages in geological research : Barrell.

Publication for geological abstracts : Tilley, 1844.

Sources and tendencies in American geology : Barrell, 70.

Strategy of minerals : Smith, 1716.

United States Geological Survey as a civic institution during the war : Paige, 1416.

Mississippi.

Geology : Lowe, 1138.

Survey, report 1916-17 : Lowe, 1137.

Economic geology.

Gypsum : Stone, 1785.

Oil and gas prospecting : Lowe, 1139.

Road-making materials : Lowe, 1140.

Historical geology.

Borings : Lowe, 1139.

Cretaceous : Berry, 129.

General : Lowe, 1139, 1140.

Paleontology.

Cretaceous floras : Berry, 129.

Foraminifera, Byram : Cushman, 434.

Pleistocene plants : Berry, 131.

Mississippian. *See* Carboniferous.

Mississippian orogenic movements : Van Tuyl, 1902.

Missouri.

State geologist, report : Buehler, 227.

Economic geology.

Barite : Tarr, 1817.

Coal : Brodie, 200.

Mineral resources : Buehler, 227.

Sand and gravel resources : Dake, 441.

Historical geology.

Barite areas : Tarr, 1817.

Cooper limestone, central Missouri : Greger, 698.

Devonian, central Missouri : Greger, 697.

General : Dake, 441.

Kimmswick and Plattin limestones : Foerste, 603.

Kinderhook group : Moore, 1343.

Section, Warren County to Jackson County : Branson, 190

Mineralogy.

Meteorite, Kansas City : Merrill, 1270.

Paleontology.

Devonian, central Missouri : Greger, 697.

Kimmswick and Plattin limestones : Foerste, 603.

Physical geology.

Concretions, Boone County, origin : Tarr, 1821.

Physiographic geology.

Ozark Highland : Sauer, 1601.

Models for determining structure of bedded rocks : Mehl, 1256.

Moingona River, preglacial : Keyes, 994.

Molding sand : Hole, 846.

Mollusca.

Alaska, Pliocene and Pleistocene : Dall, 451.

Atlantic Coastal Plain, Tertiary : Van Winkle, 1905.

Mollusca—Continued.

- Cuba, Jurassic: Sánchez Roig, 1596.
 Eocene, Virginia: Van Winkle, 1905.
 Evolution: Grabau, 690.
 Indiana, Pleistocene Mollusca: Baker, 57.
 Loess, Alton, Illinois: Baker, 59.
 Massachusetts, Boston Basin boulder clay: Morse, 1353.
 Nomenclature, rectifications: Henderson, 796.
 Ohio, Logan County, Pleistocene: Baker, 58.
 marl deposits: Sterki, 1762.
 Pleistocene Mollusca: Baker, 57.
 Oregon, John Day Basin: Hanna, 742.
 Porto Rico, Tertiary: Maury, 1250.
 South Carolina, Miocene: Gardner, 639.
 Tertiary, Porto Rico: Hubbard, 876.
 Tertiary and Quaternary, California region: Smith, 1724.
 Texas, Weno and Pawpaw formations: Adkins, 6.
 Trinidad: Van Winkle, 1905.
 West Indies, Tertiary: Cooke, 398.
- Molluscoidea. *See* Brachiopoda; Bryozoa.
 Molybdenum: Hess, 850, 855, 856; Shannon, 1674.
 Alaska, Healy River: Chapin, 332.
 British Columbia, Clinton district: Reinecke, 1537.
 Lillooet-Prince George region: Reinecke, 1538.
 Colorado, Climax: Haley, 731.
 Twin Lakes district: Howell, 874.
 Idaho: Livingston, 1110.
 New Mexico, Taos County: Larsen, 1061.
 Ontario, Ottawa Valley: Wilson, 2053, 2054.
 Renfrew-Calabogie district: Wilson, 2053.
 Quebec, Abitibi: Mailhot, 1204.
- Montana.
Areas described.
 Fergus County: Freeman, 622.
Economic geology.
 Chromite deposits: Diller, 500.
 Gold, silver, copper, lead, and zinc: Gerry, 645; Heikes, 783.
 Gypsum: Stone, 1785.
 Manganese, Butte and Phillipsburg: Pardee, 1440.
 Oil and gas possibilities: Rowe, 1583, 1584.
 Oil shale: Condit, 395.
 Stanford hematite deposits: Westgate, 1985.
Historical geology.
 Belt formation, Helena: Rothpletz, 1581.
 Central Montana: Bowen, 171.
 Helena region: Rothpletz, 1581.
 Huntley field: Hancock, 734.
 Stanford district: Westgate, 1985.
 Western Montana: Condit, 395.
Mineralogy.
 Bismutoplagonite, Wickes, Jefferson County: Shannon, 1669, 1678.
 Boulangerite, Superior: Shannon, 1678.
Paleontology.
 Belt formation, Helena: Rothpletz, 1581.
 Plants, Missoula: Jennings, 902.
Petrology.
 Sweet Grass Hills: Kemp, 976.
Physical geology.
 Belt of oblique faulting: Chamberlin, 313.
- Moraines.
 Minnesota: Leverett, 1092.
 Morrison formation, type section: Lee, 1067.
 Mounds.
 Illinois, St. Clair County, Monk's Mound: Crook, 417.
 Mule Creek oil field, Wyoming: Hancock, 736.
 Museums.
 U. S. National museum report: Merrill, 1274.

Natural bridges.

Indiana, Shades: Barrett, 77.

Natural gas: Moore, 1345; Northrop, 1379; Panyity, 1435; Sievers, 1703; Westcott, 1984.

Alberta: Dowling, 516.

northern: McLearn, 1188.

Appalachian oil and gas fields, geology: Mills, 1313.

Canada: McLennan, 1192.

Decreasing supply: Bownocker, 185.

Depletion, Appalachian field: Bownocker, 183.

Gasoline content: Dowling, 516.

Illinois, Pike and Adams counties: Coryell, 410.

Staunton gas pool: Mylius, 1363.

Indiana: Barrett, 79; Logan, 1120; Wright, 2081, 2082.

Kansas: Snider, 1736.

Allen and Neosho counties: Moore, 1347.

chemical survey: Allen, 21.

Elk City field: Boughton, 170.

map of oil and gas fields: U. S. Geol. Survey, 1895.

Wilson and Montgomery counties: Moore, 1348.

Kentucky: Jillson, 903, 906, 922, 924.

Allen County: Jillson, 913.

Barren County: Butts, 259.

Breathitt and Knox counties: Jillson, 914.

eastern: Jillson, 907.

Warren County: Jillson, 919.

Louisiana: Snider, 1736.

Mid-Continent fields: Snider, 1736.

Montana: Rowe, 1583, 1584.

North Dakota: Leonard, 1084.

Oklahoma: Shannon, 1659; Shaw, 1685; Snider, 1736.

chemical survey: Allen, 21.

Osage Reservation: Goldman, 655; Heald, 777, 779; Hopkins, 854; Robinson, 1559.

Ontario, southwestern: Williams, 2037, 2038.

future prospects: Williams, 2036.

Origin: Moore, 1345; Wegemann, 1971.

Pore space of oil and gas sands: Melcher, 1261.

Prospecting: Panyity, 1435.

Symbols for drilling operations: Mehl, 1257.

Texas: Snider, 1736.

eastern: Dumble, 524.

Petrolia field: Shaw, 1685.

Waters associated with petroleum and natural gas: Mills, 1313.

West Virginia: Reger, 1529.

Fayette County: Hennen, 797.

Webster County: Reger, 1528.

Wyoming, Fremont County, Big Sand Draw: Collier, 388.

Lance Creek field: Hancock, 787.

Nenana coal field, Alaska: Martin, 1217.

Nebraska.

Economic geology.

Alkali deposits: Barbour, 67.

Sand: Condra, 396.

Paleontology.

Diceratheres: Peterson, 1468.

Entelodonts: Troxell, 1865.

Felidae, White River beds: Thorpe, 1842.

Pleistocene, western Nebraska: Matthew, 1236.

Snake Creek fauna: Matthew, 1236.

Tertiary artiodactyls: Lull, 1147.

Nevada.

Economic geology.

Divide district: Carpenter, 296; Sizer, 1710; Young, 2098.

Gold, silver, copper, lead, and zinc: Helkes, 782, 785.

Gypsum: Stone, 1785.

Halogen salts of silver, Wonder; Young, 2099.



Nevada—Continued.

Economic geology—Continued.

Manganese: Pardee, 1441.

Colorado River desert region: Jones, 949.

Salt deposits: Phalen, 1469.

Yerington district: Gaby, 630.

Paleontology.

Cestracient spine, Triassic: Davidson, 466.

Carson footprints, origin: Stock, 1771.

Physiographic geology.

Steptoe Valley: Clark, 347.

Underground water.

Pahrump, Mesquite, and Ivanpah valleys: Waring, 1952.

Steptoe Valley: Clark, 347.

New Brunswick.

Areas described.

Burnthill Brook area: Young, 2097.

Economic geology.

General: Hayes, 771; Wright, 2089.

Oil shales: Simpson, 1706.

Peat: Anrep, 33.

Tungsten, Burnthill Brook area: Young, 2097.

Historical geology.

Delta of Little River group: Matthew, 1234.

General: Bailey, 52; Wright, 2089.

Paleogeography of Acadia: Bailey, 53.

Paleontology.

Plantae: Wilson, 2056.

Newell folio, South Dakota (no. 209): Darton, 461.

Newfoundland.

Economic geology.

Coal: Haliburton, 732.

Historical geology.

Cambrian: Howell, 873.

Pre-Cambrian, southeastern Newfoundland: Buddington, 226.

Paleontology.

Stromatocystites: Schuchert, 1627.

Petrology.

Pre-Cambrian, southeastern Newfoundland: Buddington, 226.

New Hampshire.

Economic geology.

Road materials: Goldthwait, 670.

Historical geology.

Portsmouth basin: Wandke, 1943.

Stones, dispersion in the drift: Goldthwait, 669.

Mineralogy.

Beryl Hill, Grafton: Flint, 597.

Sarcopside, Deering: Holden, 843.

Physical geology.

Submergence and postglacial uplift: Goldthwait, 668.

New Jersey.

State geologist, report: Kimmel, 1036-1038.

Economic geology.

Greensand: Mansfield, 1215.

Mineral resources: Twitchell, 1874.

Potash exploration in greensands: Mansfield, 1209.

Historical geology.

Glaucinite beds: Mansfield, 1210.

Wilmington quadrangle: Bascom, 86.

Mineralogy.

Barite, Great Notch: Wilson, 2050.

Bergen Hill region: Manchester, 1208.

Chalcocopyrite, Bergen Hill: Wherry, 1993.

Epidesmine, Mercer County: Gordon, 676.

Greensand: Mansfield, 1215.

Stilpnomelane, Lambertville: Shannon, 1676.



New Jersey—Continued.

Paleontology.

Human remains, Trenton gravels: Wright, 2087.

New Mexico.

Economic geology.

Copper: Tovote, 1855.

San Pedro, Santa Fe County: Berryman, 147.

Gold, silver, copper, lead, and zinc: Henderson, 789, 792.

Gypsum: Stone, 1785.

Hematite, Socorro County: Foshag, 618.

Manganese: Jones, 945; Wells, 1977.

Mogollon district: Scott, 1641.

Molybdenum, Taos County: Larsen, 1061.

Oil and gas possibilities, Alamosa Creek valley: Winchester, 2061.

Oil possibilities: Knox, 1031.

Oil resources: Knox, 1032.

Oil situation: Ellis, 545.

Ore deposits: Tovote, 1856.

Salt deposits: Phalen, 1469.

San Pedro, Santa Fe County: Berryman, 147.

Historical geology.

Abo sandstone: Böse, 163.

Alamosa Creek valley, Socorro County: Winchester, 2061.

Chaves County: Merritt, 1280.

Eastern New Mexico: Baker, 55.

General: Keyes, 992, 993; Knox, 1031.

Manzano group: Lee, 1068.

Northeastern New Mexico: Garrett, 640.

Pecos Valley: Semmes, 1658.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Puertecito district: Wells, 1978.

San Pedro, Santa Fe County: Berryman, 147.

Taos Range: Gruner, 720.

Tertiary intrusives, Pecos Valley: Semmes, 1658.

Paleontology.

Ammonoids, Abo sandstone: Böse, 163.

Reptilia, San Juan County: Gilmore, 656.

Physical geology.

Chaves County: Merritt, 1280.

General: Keyes, 992.

Mountain structure: Darton, 465.

Northeastern New Mexico, structure: Garrett, 640.

Puertecito district: Wells, 1978.

Structure features: Knox, 1031.

New York.

State geologist, report: Clarke, 349.

Areas described.

Canton quadrangle: Chadwick, 310.

Lake Clear region: Alling, 26.

Lake Placid quadrangle: Miller, 1303.

Schroon Lake quadrangle: Miller, 1304.

Economic geology.

Catskill Portland-cement region: Jones, 951.

Clinton iron ores, genesis: Smyth, 1735.

Gypsum: Stone, 1785.

Iron ores, Clinton County: Miller, 1307, 1309.

Magnetic iron ores, Clinton County: Newland, 1374.

Manganese, postglacial, Columbia County: Dale, 447.

Petroleum: Johnson, 940.

Pyrite and pyrrhotite veins, Jefferson and St. Lawrence counties: Buddington, 224.

Salt deposits: Phalen, 1469.

Silica materials: Colony, 392.

Historical geology.

Adirondacks, geologic history: Miller, 1310; pre-Cambrian: Alling, 28.

Canton quadrangle: Chadwick, 310.

Catskill Portland-cement region: Jones, 951.

Devonian, western New York: Hussakof, 884.

New York—Continued.

Historical geology—Continued.

- Genesee River region: Fairchild, 561.
 Hanover shale: Chadwick, 309.
 Lake Bonaparte-Lowville quadrangles: Buddington, 225.
 Oriskany sandstone: Eaton, 535.
 Pleistocene history: Fairchild, 564.
 Portage stratigraphy, western New York: Chadwick, 308.
 Pre-Cambrian, Adirondacks: Alling, 28.
 Saratoga region: Rothpletz, 1582.
 Sherburne sandstone: Grabau, 685.
 Trenton section, Martinsburg: Clark, 345.

Mineralogy.

- Calcite cave in State Museum: Gardner, 638.
 Pyrite, New York City: Whitlock, 2013.
 Sterlingbush calcite cave: Clarke, 360.

Paleontology.

- Armstrongia, Devonian glass sponge: Clarke, 355.
 Bunaia woodwardi, Silurian: Clarke, 351, 354.
 Carnyella valcourensis, Chazy limestone: Clark, 346.
 Cryptozoon: Rothpletz, 1582.
 Eurypterid horizon: Chadwick, 307.
 Fishes in museum of Buffalo Society of Natural Sciences: Hussakof, 884.
 Pleistocene Mammalia, Monroe, Orange County: Clarke, 358.
 Proboscidea: Hay, 766.
 Trenton fauna, Martinsburg: Clarke, 345.
 Vernon shale fauna: Ruedemann, 1586.

Petrology.

- Adirondacks, Lyon Mountain region: Miller, 1305.
 Anorthosite gabbro, Saint Lawrence County: Miller, 1311.
 Dolomites, composition: Reed, 1523.
 Lake Bonaparte-Lowville quadrangles: Buddington, 225.

Physical geology.

- Brecciation, Niagara limestone, Rochester: Giles, 651.
 Faulting, Orleans County: Chadwick, 311.
 Foliation, Lewis County: Buddington, 225.

Physiographic geology.

- Catskill Mountains: Merwin, 1287.
 Cohoes quadrangle: Stoller, 1774.
 Drainage changes, east central New York: Stoller, 1773.
 Drumlins, Lake Placid: Upham, 1897.
 Genesee River region: Fairchild, 561.
 Glaciation, northern New York: Fairchild, 566.
 Lake Placid quadrangle, Pleistocene geology: Alling, 27.
 Little Falls gorge: Miller, 1308.
 Mechanicsville terraces: Stoller, 1773.
 Niagara cuesta: Grabau, 691.
 Pleistocene marine submergence of the Hudson, Champlain, and St. Lawrence valleys: Fairchild, 556.
 Postglacial waters: Stoller, 1773.
 Rochester Canyon: Fairchild, 561.
 Niagara cuesta: Grabau, 691.

Nicaragua.

Economic geology.

- Eastern Nicaragua: Garbrecht, 637.

Physical geology.

- Masaya and Momotombo: Sapper, 1598.
 Nickel: Hess, 800, 805, 807; Rickard, 1550.
 Alaska, Chichagof Island, western part: Overbeck, 1411.
 Copper River valley: Overbeck, 1412.
 Magnetic nickel deposits: Lindgren, 1107.
 Norite occurrences: Coleman, 383.
 Ontario: Simmersbach, 1704.
 Cobalt: Whitehead, 2010.
 Shebandowan deposit: Cross, 421.
 Sunbury: Bell, 113.
 Windy Lake region: Knight, 1018.

Nitrate.

Guatemala: Gale, 632.

Nomenclature.

Aulacera: Schuchert, 1626.

Beatrice: Schuchert, 1626.

Glossary of mining and mineral industry: Fay, 576.

Louisian vs. Mississippian: Keyes, 989.

Mississippian: Keyes, 999.

Post-Mesozoic: Grabau, 684.

North Carolina.

Survey report, 1917-18: Pratt, 1487.

Economic geology.

Chromite deposits: Diller, 500; Lewis, 1098.

Garnet: Katz, 957.

Hydromica: Bayley, 104.

Kaolin: Bayley, 104.

Mineral resources: Pratt, 1488.

Mining industry, 1913-17: Pratt, 1488.

Talc, Hewitts: Diller, 504.

Mineralogy.

Hydromica: Bayley, 104.

Paleontology.

Mesozoic flora: Berry, 143.

Physiographic geology.

Dismal Swamp: Osbon, 1399.

North Dakota.

Economic geology.

Oil and gas possibilities: Leonard, 1084.

Historical geology.

General: Leonard, 1082, 1084.

Western North Dakota: Stanton, 1756.

Mineralogy.

Meteorite, Richardton: Quirke, 1502-1504.

Paleontology.

Cannonball fauna: Stanton, 1756.

Physiographic geology.

Pleistocene deposits, interpretations: Todd, 1849.

Surface features: Leonard, 1083.

Northfield, Vermont, terranes: Richardson, 1545.

Nova Scotia.

Economic geology.

Cape Breton County: Hayes, 770.

Carboniferous salt and potash deposits, Cumberland County: Hayes, 775.

Coal: Hayes, 773.

General: Hayes, 771; Wright, 2089.

Iron deposits of sedimentary origin: Hayes, 774.

Mineral resources: Drummond, 421.

Salt, Cumberland County: Cole, 376, 378; Hayes, 772.

Southwestern Nova Scotia: Faribault, 572.

Western Nova Scotia: Faribault, 570, 571.

Historical geology.

Cape Breton County: Hayes, 770.

General: Wright, 2089.

Malagash Peninsula, Cumberland County: Hayes, 772.

Paleogeography of Acadia: Bailey, 53.

Southwestern Nova Scotia: Faribault, 572.

Western Nova Scotia: Faribault, 570.

Mineralogy.

Ferric minerals: Spencer, 1746.

Physical geology.

Coast erosion, Capt Breton: Gray, 694.

Eskers, nature and origin: Prest, 1490.

Ocean basins, origin: Willis, 2049.

Ohio.

Areas described.

Muskingum County: Stout, 1794.

Ohio—Continued.

Economic geology.

- Berea sand: Panyity, 1436.
 Coal: Stout, 1795; Muskingum County: Stout, 1794.
 Gypsum: Stone, 1785.
 Petroleum: Bownocker, 184.
 Pyrite in coal: Tucker, 1866.
 Salt deposits: Phalen, 1469.

Historical geology.

- Berea sand, Panyity, 1436.
 Dunkard series: Stauffer, 1757.
 Geologic map: Bownocker, 182.
 Northeastern Ohio: Decker, 483.
 Sedimentary rocks, thickness: Hills, 831.
 Silurian: Foerste, 559.

Paleontology.

- Cystids and blastoids, Cedarville: Foerste, 604.
 Dunkard series: Stauffer, 1757.
 Echinodermata, Brassfield formation: Foerste, 598.
 Marl deposits, Mollusca: Sterki, 1762.
 Pleistocene Mollusca: Baker, 57; Logan County: Baker, 58.
 Silurian: Foerste, 599.

Physical geology.

- Caves, Put-in-Bay, origin: Cottingham, 412.
 Ogilvie Range, Yukon: Cockfield, 372.
 Oil-field waters: Rogers, 1566.
 Oil pools, relation to ancient shore lines: Jones, 953.
 Oil shales: Alderson, 16, 17; Hoskin, 864; Roeschlaub, 1561; Trager, 1859; Winchester, 2060.
 Colorado: Chase, 337.
 DeBeque: DeBeque, 482.
 northwestern: Lunt, 1149.
 Indiana: Reeves, 1527.
 Kentucky, Estill County: Crouse, 426.
 Montana, Idaho, Wyoming, and Utah: Condit, 395.
 New Brunswick: Simpson, 1706.
 Ontario, Abitibi River: Williams, 2041.
 Wyoming, Rock Springs area, Sweetwater County: Schultz, 1639.
 southwestern: Schramm, 1621.

Oklahoma.

Economic geology.

- Carbon ratios of coals and relation to petroleum: Fuller, 629.
 Cement oil field, Caddo County: Clapp, 340.
 Gypsum: Stone, 1785.
 Hogshooter gas sand: Berger, 123.
 Kay County, pre-Pennsylvanian oil horizons: Aurin, 50.
 Lead ore, rapid formation: Wheeler, 1991.
 Mid-Continent oil fields: Bosworth, 169.
 Natural gas: Shaw, 1685; Snider, 1736.
 Natural gases, chemical survey: Allen, 21.
 Oil and gas development: Shannon, 1659.
 Oil and gas resources, Osage Reservation: Bowen, 172; Goldman, 665, 667; Heald, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross 1578.
 Oil-field waters: Rogers, 1567.
 Petroleum: Snider, 1736.
 Osage Nation: Mason, 1224.
 Salt deposits: Phalen, 1464.
 Unconformities, bearing on occurrence of petroleum: Bloesch, 155.

Historical geology.

- Arbuckle Mountains: Decker, 483.
 Cement oil field, Caddo County: Clapp, 340.
 General: Snider, 1736.
 Hogshooter gas sand: Berger, 123.
 Kay County, pre-Pennsylvanian oil horizons: Aurin, 50.
 Mississippian tuff, Ouachita Mountains: Miser, 1318.
 Osage Reservation: Bowen, 172; Goldman, 665-667; Heald, 770-780; Hopkins, 854; Robinson, 1559, 1560; Ross, 1578.

Oklahoma—Continued.

Historical geology—Continued.

- Ouachita Mountains, southern: Honess, 852.
- Pennsylvanian sedimentation around Healdton Island: Merritt, 1279.
- Red beds area: Greene, 695.
- Wreford and Foraker limestones: Twenhofel, 1867.

Paleontology.

- Pleistocene Vertebrata: Hay, 768.

Physical geology.

- Faulting and folding: Fath, 575.
- Osage County, folds: Millikan, 1312.

Underground water.

- Oil-field waters: Rogers, 1567.

Ontario.

Areas described.

- Abitibi-Night Hawk gold area, Timiskaming district: Knight, 1015.
- Gowganda silver area: Burrows, 245.
- Kirkland Lake gold area: Burrows, 246.
- Larder Lake gold area: Hopkins, 855.
- Matichewan district, northern Ontario: Burrows, 244; Cooke, 401.
- West Shiningtree gold area: Hopkins, 856.

Economic geology.

- Abitibi-Mattagami area: Cross, 422.
- Apatite deposits: Spence, 1745.
- Argonaut gold mine: Knight, 1020.
- Clay, Mesozoic, northern Ontario: Keele, 965.
- Clay and shale deposits, Abitibi and Mattagami rivers: Keele, 966.
- Cobalt: Drury, 522; diffusion in vein genesis: Whitman, 2020.
- Cobalt veins: Whitehead, 2010.
- Gold, Ben Nevis area: Knight, 1019.
- Kirkland Lake gold area: Burrows, 246.
- Larder Lake gold area: Hopkins, 855.
- Lightning River gold area: Burrows, 243.
- Gold, Matichewan area: Burrows, 244; Cooke, 401, 404.
- Porcupine: Dougherty, 511.
- West Shiningtree area: Hopkins, 856.
- Graphite, Renfrew district: Wilson, 2054.
- Iron: O'Connor, 1386.
- Kirkland Lake district: Cooke, 406; Johnson, 934.
- Larder Lake district, northern Ontario: Pearce, 1457.
- Lake Superior region, Port Arthur-Nipigon: Tanton, 1815.
- Lost placers: Coleman, 381.
- Mattagami and Abitibi rivers: Williams, 2040, 2041.
- Michipicoten district: Collins, 390, 391.
- Mineral resources: Gibson, 647; Rogers, 1572.
- Molybdenite, Ottawa Valley: Wilson, 2054.
- Renfrew-Calabogie district: Wilson, 2054.
- Montreal River district: Anon., 2106.
- Nickel: Simmersbach, 1704.
- Shebandowan deposit: Cross, 421.
- Windy Lake and other areas: Knight, 1018.

Northern Ontario: Tanton, 1814.

Northpines pyrite mines: Hanson, 744.

Oil and gas geology: Williams, 2037.

Oil and gas prospects: Williams, 2036.

Oil fields, southwestern Ontario: Williams, 2035, 2038.

Oil in Tanton syncline, Kent County: Williams, 2039.

Ottawa Valley: Wilson, 2053, 2054.

Peat bogs: Anrep, 34.

Pitchblende, Butt township: Hore, 862; Knight, 1017.

Porcupine gold field: Bell, 114.

Pyrite, Calabogie district: Wilson, 2054.

Goudreau: Collins, 390.

Report of Bureau of Mines: Ont. Bur. Mines, 1394.

Report of Department of Mines: Ont. Dept. Mines, 1395.

Ontario—Continued.

Economic geology—Continued.

- Road materials, eastern Ontario: Picher, 1472.
- Sand and gravel: Ledoux, 1063.
- Siderite deposits, Mattagami River: Cross, 422.
- Silurian, southwestern Ontario: Williams, 2034.
- Silver, Gowanda area: Burrows, 245.
- Silver Islet, Thunder Bay district: Tanton, 1816.
- Sudbury nickel-copper deposits: Bell, 113.
- Wasapika gold area, Sudbury district: Hore, 857-861.
- West Shiningtree gold district: Goodwin, 671.

Historical geology.

- Abitibi-Mattagami area: Cross, 422.
- Argonaut gold mine: Knight, 1020.
- Ben Nevis gold area: Knight, 1019.
- Cobalt conglomerate, origin: Coleman, 382.
- Haileyburian intrusives: Miller, 1301, 1302.
- Hudson Bay region: Savage, 1603.
- James Bay region: Savage, 1603.
- Lake Superior region, Port Arthur-Nipigon: Tanton, 1815.
- Michipicoten district: Collins, 390.
- Montreal River district: Anon., 2106.
- Oil and gas geology: Williams, 2037.
- Paleozoic, Mattagami and Abitibi rivers: Williams, 2040, 2041.
- outlier, Lake Timiskaming: Hume, 881.
- south of James Bay: Williams, 2042.
- Patricia: Burwash, 248.
- Pre-Cambrian: Miller, 1300; correlation: Cooke, 407.
- Shebandowan nickel deposit: Cross, 421.
- Silurian, southwestern Ontario: Williams, 2034.
- Steep Rock series: Rothpletz, 1582.
- Timiskaming region: Hume, 881.
- West Shiningtree gold district: Goodwin, 671.
- Windy Lake region: Knight, 1018.

Mineralogy.

- Barite, stalactitic, Madoc: Walker, 1937.
- Echellite, Sextant Portage, Abitibi River: Bowen, 177.
- Elaterite, Madoc: Knight, 1016.
- Fluorite, optical, Madoc: Greenland, 696; Walker, 1938.
- Stephanite, Coleman township: Poitevin, 1478.
- Titanite and polycrase, crystallography: Poitevin, 1477.

Paleontology.

- Pelecypoda, Toronto: Stewart, 1765.
- Silurian, southwestern Ontario: Williams, 2034.
- Steep Rock series: Rothpletz, 1582.

Petrology.

- Butt township, pitchblende deposits country rock: Hore, 863.

Physical geology.

- Erosion by ice sheet: Tyrrell, 1977.

Physiographic geology.

- Timiskaming region: Hume, 881.
- Opisthotonos: Dean, 481; Moodie, 1336.
- Ordovician. *See also* Paleontology, Ordovician.

Acadia: Bailey, 53.

Alabama, northern: Semmes, 1656.

Alberta, Glacier Lake section: Walcott, 1928.

Arctic regions, Ellesmere Land: Holtdahl, 850.

Arkansas: Miser, 1319; Batesville district: Miser, 1320.

Georgia: McCallie, 1159.

Greenland, northwestern: Koch, 1033.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

Illinois, La Salle quadrangle: Cady, 267, 270.

New Richmond sandstone, northern Illinois: Cady, 266.

Thebes sandstone: Savage, 1602.

Indiana, Madison: McEwan, 1174; Saluda limestone: Sulzer, 1800.

Kentucky: Miller, 1293.

Ordovician—Continued.

- Manitoba, Hudson Bay region: Savage, 1603.
 Reed and Wekusko lakes region: Alcock, 10.
 Reed-File lakes area: Alcock, 11.
 Reed Lake-Elbow Lake: Bruce, 208.
- Maryland: Bassler, 90.
- Minnesota: Grout, 715.
- Missouri: Branson, 190; Kimmswick and Plattin limestones: Foerste, 603.
 Mud-crack horizons: Kindle, 1007.
- New Brunswick: Bailey, 52.
- New Mexico: Keyes, 993; eastern: Baker, 55.
- New York, Canton quadrangle: Chadwick, 310.
 Martinsburg, Trenton section: Clark, 345.
- Ontario, Lake Timiskaming: Hume, 881.
 Mattagami and Abitibi rivers: Williams, 2040.
- Pennsylvania, central: Field, 590.
- Quebec, Coleraine area: Knox, 1030.
- Tennessee: Raymond, 1515.
 Overton County: Butts, 258.
 Rutherford County: Galloway, 638.
 Sumner County: Mather, 1227.
- Texas: Udden, 1880.
- Utah: Butler, 255; Tintic district: Lindgren, 1105.
- Vermont, central: Richardson, 1544.
 Green Mountains, western flank: Dale, 446.
 Northfield: Richardson, 1545.
 Roxbury: Richardson, 1546.
- Virginia: Raymond, 1515.
- Wisconsin, Tomah-Sparta quadrangles: Twenhofel, 1870.
- Ore deposits, origin. *For ore deposits in general see Economic geology (general).*
- Apatite deposits, Canada: Spence, 1745.
- Arizona, Jerome district, Yavapai County: Reber, 1522.
- Barite, magmatic origin: Lewis, 1097.
 Missouri: Tarr, 1817.
- Bindheimite as an ore mineral: Shannon, 1668.
- British Columbia, Hazleton: O'Neill, 1890.
- Canada, ore bodies in pre-Cambrian: Dougherty, 512.
- Chalcopyrite deposits, northern Minnesota: Bruce, 211.
- Chromite deposits: Diller, 500.
- Cobalt, Ontario: Whitehead, 2010; Whitman, 2020.
- Colorado, Twin Lakes district: Howell, 874.
- Copper, Alaska, Kennecott: Bateman, 98.
 Evergreen ores, Gilpin County, Colorado: McLaughlin, 1184.
 in a meteorite vein: Quirke, 1504.
 Lake Superior region: Lang, 1056; Spurr, 1751.
 native, Nonsuch formation, Michigan: Nishio, 1375.
 Ray-Miami region, Arizona: Ransome, 1507.
- Copper sulphides, La Fleur Mountain, British Columbia: McLaughlin, 1183.
- Diffusion in vein genesis at Cobalt: Whitman, 2020.
- Duluth, gabbro, basal phases: Nebel, 1369.
- Enrichment of tungsten ores: Gannett, 636.
- Fluorspar deposit: Aurand, 48; Hardin County, Illinois: Weller, 1973.
- Formation of ore bodies: Kendall, 977.
- Gold, Ontario, Matachewan district: Cooke, 404.
 Quebec, Lake Demontigny: Mailhot, 1202.
- Iron, Belcher Islands, Hudson Bay: Moore, 1341.
 British Columbia, Taseko Valley: Brewer, 194.
 Clinton ores: Smyth, 1735.
 Cuba, Santiago: Kimball, 1002.
 Gogebic Range: Hotchkiss, 865.
 limonite, Mayaguez, Porto Rico: Fettke, 589.
 magnetic ores, Clinton County, New York: Miller, 1307, 1309.
 Mesabi ores, Minnesota: Grout, 718.
 New York, Clinton County magnetites: Newland, 1374.
- Iron depositing bacteria: Harder, 745.
- Kaolin, Indiana: Logan, 1119.

Ore deposits, origin—Continued.

- Lead and zinc ore, formation : Wheeler, 1991.
 Location of ores : Bateman, 97.
 Magnetite and hematite, relations : Broderick, 196.
 Magnetite deposits, eastern Mesabi range : Grout, 716.
 Manganese : Harder, 746.
 Colorado : Jones, 948.
 Cuba : Burchard, 237.
 Georgia : Hull, 878.
 postglacial, Columbia County, New York : Dale, 447.
 Virginia : Stose, 1786.
 Mechanics of vein formation : Taber, 1805.
 Mexico : Lewis, 1100; Hidalgo, El Chico : Wittich, 2071.
 Mineral deposits : Lindgren, 1104.
 Minnesota, Mesabi ores : Grout, 718.
 Quartz in veins, genesis : Bancroft, 64.
 Pyritic deposits in metamorphic rocks : Hanson, 744.
 Silver, British Columbia, Stewart district : Dolmage, 508.
 native, Nonesuch formation, Michigan : Nishio, 1375.
 Ontario, Silver Islet : Tanton, 1816.
 Smithsonite, formation : Watson, 1966.
 Southwestern ore deposits, age and classification : Wilson, 2055.
 Sulphate minerals in ore deposits : Butler, 254.
 Sulphides, relation to water level in Mexico : Lucke, 1143.
 Tungsten ores, enrichment : Gannett, 636.
 Utah : Butler, 253, 255; Tintic district : Lindgren, 1105.
 Vein formation : Taber, 1805.
 Vein quartz, microscopic study : Adams, 5.
 Washington : Patty, 1455; Stevens County : Weaver, 1970.
 Zinc, Tintic district, Utah : Lindgren, 1105.
 Wisconsin district : Boericke, 160.
- Oregon.
 Geology : Smith, 1728.
 Report of Bureau of Mines, 1917-18, 1919-20 : Parks, 1448, 1449.
- Economic geology.*
 Gold, silver, copper, and lead : Yale, 2093, 2095.
 Gypsum : Stone, 1744.
 Mineral resources : Swartley, 1802.
 Oil and gas possibilities, western Oregon : Harrison and Eaton, 761.
 Potassium nitrate : Nattress, 1365.
 Quicksilver, Jackson County : Kellogg, 968.
 Waldo district, Josephine County : Kellogg, 969.
- Historical geology.*
 Eagle Creek formation : Chaney, 325.
 Pleistocene history : McCornack, 1165.
 Waldo district, Josephine County : Kellogg, 969.
- Paleontology.*
 Eagle Creek flora : Chaney, 325, 326.
 Echinoidea : Kew, 981.
 Mollusca, John Day Basin : Hanna, 742.
- Physical geology.*
 Caves, Josephine County : Williams, 2023.
 Earthquakes : Smith, 1732.
- Physiographic geology.*
 Pleistocene history : McCornack, 1165.
 Pleistocene submergence, Columbia Valley : Bretz, 192.
- Orogeny.
 Folded and fault-block mountains, relation : Woodworth, 2078.
 General : Chamberlin, 312.
 Great Basin ranges : Keyes, 991.
 Mississippian orogenic movements : Van Tuyl, 1902.
 Rocky Mountain geosynclinal, Canada : Burwash, 250.
 Rocky Mountains : Chamberlin, 313; Dake, 445; Colorado : Chamberlin, 312.
 Uphrust faulting : Willis, 2044.
 Orthophragmina and Lepidocyclina : Cushman, 435.
 Oscillation. *See* Changes of level.
 Palangana salt dome, Duval County, Texas : Barton, 85.

Paleocene, status and limits: Matthew, 1242.

Paleobotany.

- Aralias, Cretaceous: Fritel, 625.
- Brandon flora: Berry, 133.
- Canthelophorus, Carboniferous: Bassler, 89.
- Cretaceous floras: Berry, 140; Gulf region: Berry, 129.
- Cycadeoidea, distribution and relationships: Wieland, 2027.
- Cycadophyta, classification: Wieland, 2030.
- Dakota flora, age: Berry, 145.
- Eagle Creek flora, Oregon and Washington: Chaney, 325.
- Eucalyptus: Berry, 132.
- General: Guppy, 723; Hollick, 849; Knowlton, 1028; Wieland, 2026.
- Hazel, history: Berry, 137.
- Hymenaea, Cretaceous, Alabama: Berry, 130.
- Linden and ash, history: Berry, 126.
- Locust, geologic history: Berry, 127.
- Maryland, Federal Hill: Berry, 141.
- Mesozoic and Cenozoic plants, catalog: Knowlton, 1027.
- Mesozoic floras of North and South America: Knowlton, 1026.
- Mississippi, Pleistocene plants: Berry, 131.
- Montana, Missoula region: Jennings, 902.
- Morrison flora, Colorado: Knowlton, 1029.
- New Brunswick: Wilson, 2056.
- North Carolina, Mesozoic flora: Berry, 143.
- Sequoia, ancestry: Berry, 139.
- Sweet gum, history: Berry, 137.
- Teaching paleobotany: Berry, 142.
- Tennessee, late Cretaceous plants: Berry, 140.
- Pleistocene plants: Berry, 131.
- Tertiary floras: Berry, 128.
- Tetracentron, Trochodendron, and Drimys: Wieland, 2028.
- Texas, trans-Pecos region, Eocene: Berry, 136.
- Upper Cretaceous: Berry, 135.
- Wood, replacement by dolomite: Adams, 4.

Paleoclimatology.

- Alaska: Blackwelder, 151.
- Evolution of geologic climates: Knowlton, 1028.
- General: Knowlton, 1028; Sayles, 1606; Visher, 1921.
- Ordovician: Kindle, 1007.
- Paleozoic, late: Case, 299.
- Pre-Cambrian, Quebec: Cooke, 403.
- Tertiary and Quaternary, California region: Smith, 1724.

Paleogeographic maps.

- Devonian: Dunbar, 525; Savage, 1603.
- Eocene: Stanton, 1756.
- Ordovician: Savage, 1603.
- Paleozoic, Atlantic-Arctic region: Hortedahl, 851.
- late: Case, 299.
- Silurian: Savage, 1603.
- Upper Cretaceous: Stanton, 1756.

Paleogeography. See also Geologic history; Paleoclimatology; Paleogeographic maps.

- Acadia: Bailey, 53.
- Atlantic bridges nonexistent: Matthew, 1240.
- Caribbean region: Vaughan, 1910.
- Devonian: Grabau, 685.
- General: Case, 299; Schuchert, 1637; Ulrich, 1891.
- Great Lake region: Grabau, 691.
- Little River group delta: Matthews, 1234.
- Maryland, Cambrian and Ordovician: Bassler, 90.
- Mississippian orogenic movements: Van Tuyl, 1902.
- New Mexico: Keyes, 992.
- Paleozoic, Atlantic-Arctic region: Hortedahl, 851.
- late: Case, 299.
- Pennsylvanian sedimentation around Haldton Island: Merritt, 1279.
- Permo-Carboniferous: Case, 300; deposition conditions: Case, 298.
- Pre-Cambrian: Ruedemann, 1585.
- Ripple mark, interpretation: Bucher, 222.

Paleogeography—Continued.

- Tertiary floras: Berry, 128.
 Upper Cretaceous Mississippi Gulf: Berry, 135.
 West Indies: Trelease, 1860.
- Paleontology.** *For regional see names of States. See also the classes of animals and Invertebrates (general); Paleobotany; and Evolution.*
 Applied paleontology: Weller, 1976.
 California Academy of Sciences, report of curator: Hanna, 743.
 Collections in Boston and vicinity: Raymond, 1516.
 Development stages in teaching paleontology: Jackson, 892.
 Disease in extinction of races: Moodie, 1331.
 Fossil, definition: Miller, 1299; use of term: Field, 592.
 General: Bather, 103.
 Paleontologic studies, practical value: Berry, 146.
 Paleozoic, late: Case, 299.
 Parasitic disease: Bather, 102.
 Place of paleontology among the sciences: Clarke, 353.
 Present tendencies in paleontology: Berry, 134.
- Cambrian.**
 Algae, Middle Cambrian: Walcott, 1931.
 Belt fauna: Rothpletz, 1581.
 Maryland: Bassler, 90.
 Middle Cambrian: Walcott, 1930.
 Montana, Helena region: Rothpletz, 1581.
 Spongiae, British Columbia: Walcott, 1932.
 Stromatocystites, Newfoundland: Schuchert, 1627.
- Carboniferous.**
 Algal deposits: Twenhofel, 1869.
 Arizona, northwestern: Shimer, 1693.
 Bend series, central Texas: Moore, 1244.
 Chester fauna: Weller, 1973.
 Indiana, Orange County, Chester formations: Hole, 847.
 Iowa, Fort Dodge, Ste. Genevieve marls: Lees, 1073.
 southwestern: Smith, 1714.
 Kansas: Moore, 1346.
 Kentucky, Kendrick shale: Jillson, 911.
 Maryland, Cantheliophorus: Bassler, 89.
 coal measures: Swartz, 1804.
 Mexico, Coahuila, Permian: Haack, 724.
 New Mexico, Abo sandstone ammonoids: Böse, 163.
 Ohio, Dunkard series: Stauffer, 1757.
 Paleozoic, late: Case, 299.
 Permo-Carboniferous ammonoids, Glass Mountains, Texas: Böse, 161.
 Pocono Brachiopoda: Price, 1493.
 Utah, Girty, 661.
 West Virginia, Webster County: Price, 1492.
- Cretaceous.**
 Alabama, Hymenaea: Berry, 130.
 Alberta, Edmontosaurus: Lambe, 1049.
 Pelecypoda: McLearn, 1189, 1191.
 Aralias: Fritel, 625.
 Cannonball fauna: Stanton, 1756; corals: Vaughan, 1916.
 Colorado, northeastern: Henderson, 794.
 Dakota flora, age: Berry, 145.
 Didymotis trinidadensis, Lower Cretaceous, Trinidad: Sommermeier, 1738.
 Fish scales: Cockerell, 366.
 Gulf region: Berry, 129.
 Kansas: Moore, 1346.
 Maryland, Federal Hill: Berry, 141.
 Mesozoic floras of North and South America: Knowlton, 1026.
 Mexico, Coahuila, Turonian ammonite fauna: Böse, 164.
 Guerrero, Zumpango: Burckhardt, 240.
 Morrison flora, Colorado: Knowlton, 1029.
 New Mexico, San Juan County, Reptilia: Gilmore, 656.
 North Carolina, Mesozoic flora: Berry, 143.
 Plantae, catalog: Knowlton, 1027.
 Tennessee, late Cretaceous plants: Berry, 140.

Paleontology—Continued.

Cretaceous—Continued.

- Texas, Buda and Georgetown limestones, Turritella: Ellis, 546.
- Exogyra: Böse, 162.
- Fredericksburg and Washita formations: Adkins, 7.
- Pectinidae: Kniker, 1021.
- Tarrant County: Winton, 2062.
- Weno and Pawpaw formations: Adkins, 6.

Devonian.

- Glass-sponge colonies: Clarke, 357.
- Missouri, central: Greger, 697.
- New York, Sherburne sandstone: Grabau, 685.
- Vernon shale fauna: Ruefemann, 1586.
- Ontario, James Bay region: Savage, 1603.
- Pisces: Hussakof, 884.
- Portage fauna, Mackenzie River valley: Kindle, 1006.
- Tennessee, western: Dunbar, 525, 526.
- Thread moulds and bacteria: Moodie, 1340.

Jurassic.

- Cardioceratidae: Reeside, 1525.
- Cuba, ammonite fauna: O'Connell, 1384.
- Viñales: Sánchez Roig, 1595, 1596.
- Mexico, Zacatecas, Symon: Burckhardt, 240.
- Plantae, catalog: Knowlton, 1027.

Ordovician.

- Cincinnati, Tribolita: Foerste, 600.
- Maryland: Bassler, 90.
- Illinois, Thebes sandstone: Savage, 1602.
- Indiana, Madison: McEwan, 1174.
- Missouri, Kimmswick and Platt in limestones: Foerste, 603.
- New York, Martinsburg, Trenton fauna: Clark, 345.
- Ontario, Toronto, Pelecypoda: Stewart, 1765.
- Pennsylvania, central: Field, 590.
- Platystrophia: McEwan, 1173.
- Tribolita: Raymond, 1518.
- Vermont, central: Richardson, 1544.

Pre-Cambrian.

- Algal deposits: Twenhofel, 1869.
- Organic structures, Biwabik iron-bearing formation: Grout, 717.
- Steep Rock series: Rothpletz, 1582.

Quaternary.

- Alaska, Pleistocene: Dall, 451.
- Atlantic Coastal Plain, Pleistocene: Hay, 765.
- Florida, Mammalia and Pisces: Hay, 764.
- Helicina occulta, Iowa: Shimek, 1691.
- Indiana, Pleistocene Mollusca: Baker, 57.
- Loess, Alton, Illinois: Baker, 59.
- Maryland, Cumberland, Pleistocene peccaries: Gidley, 649.
- Mississippi, Pleistocene plants: Berry, 131.
- Nebraska, western, Pleistocene: Matthew, 1236.
- Ohio, Logan County, Pleistocene Mollusca: Baker, 58.
- Pleistocene Mollusca: Baker, 57.
- Plantae, catalog: Knowlton, 1027.
- Pleistocene: Baker, 56; Vertebrata: Hay, 767-769.
- Tennessee, Pleistocene plants: Berry, 131.
- Texas, Dallas County: Shuler, 1696.

Silurian.

- Echinodermata, Brassfield formation, Ohio: Foerste, 598.
- Illinois, Orchard Creek shale: Savage, 1602.
- Iowa, Herpetocrinus: Thomas, 1834.
- Manitoba, Hudson Bay region: Savage, 1603.
- Massachusetts, Essex County: Foerste, 605.
- Michigan, Mackinac County, Heterolasma: Ehlers, 540.
- New York, Crustacea: Clarke, 351.
- Ohio: Foerste, 599; Cedarville, cystids and blastoids: Foerste, 604.
- Ontario, Hudson Bay region: Savage, 1603.
- southwestern: Williams, 2034.

Paleontology—Continued.

Silurian—Continued.

Trilobita: Foerste, 600.

Wisconsin, Racine, cystids and blastoids: Foerste, 604.

Tertiary.

Alaska, Pliocene: Dall, 451.

Pribilof Islands: Dall, 450; Hanna, 741.

Artiodactyls: Lull, 1147.

Brandon flora: Berry, 133.

California, Mohave Desert: Merriam, 1264.

southern, Pisces: Jordan, 954.

southern coast ranges, Vertebrata: Stock, 1770.

Cannonball fauna: Stanton, 1756; corals: Vaughan, 1916.

Colorado, Florissant, parasitic Hymenoptera: Cockerell, 368.

Cuba, Miocene and Pliocene Squalidae: Sanchez Roig, 1597.

Dominican Republic, decapods: Rathbun, 1413.

Early Tertiary Bryozoa: Canu, 290.

Eocene flora, trans-Pecos Texas: Berry, 136.

Florida, Miocene Foraminifera: Cushman, 436.

Insecta, Rocky Mountains: Cockerell, 369.

Montana, Missoula region, plants: Jennings, 902.

New Mexico, San Juan County, Reptilia: Gilmore, 656.

Oregon, Eagle Creek flora: Chaney, 325.

John Day Basin, Mollusca: Hanna, 742.

Orthophragmina and Lepidocyclus: Cushman, 435.

Panama Canal Zone: Vaughan, 1910.

Plantae, catalog: Knowlton, 1027.

Porto Rico, Mollusca: Hubbard, 876; Maury, 1250.

St. Maurice and Claiborne Pelecypoda: Harris, 756.

Snake Creek fauna: Matthew, 1236.

South Carolina, Mollusca, Miocene: Gardner, 639.

South Dakota, Black Hills region: O'Hara, 1389.

Uinta Basin, Eocene Mammalia: Peterson, 1467.

Virginia, Eocene Mollusca: Van Winkle, 1905.

Wasatch and Wind River faunas: Matthew, 1237.

Washington, Eagle Creek flora: Chaney, 325.

West Indies, Algae: Howe, 872.

Bryozoa: Canu, 289.

decapod Crustacea: Rathbun, 1512.

Foraminifera: Cushman, 432.

Mollusca: Cooke, 398.

Triassic.

Nevada, cestraciont spine: Davidson, 466.

Plantae, catalog: Knowlton, 1027.

Utah: Girty, 661.

Paleopathology.

General: Moodie, 1331, 1332, 1333, 1334, 1337, 1338.

Opisthotonos: Dean, 481; Moodie, 1336.

Parasitic disease: Bather, 102.

Paleozoic (undifferentiated).

Alaska, Kiwalik-Koyuk region: Harrington, 755.

northern, Canning River region: Leffingwell, 1074.

Tolstoi district: Harrington, 752.

British Columbia, Ainsworth district: Schofield, 1619.

New Brunswick, Burnthill Brook area: Young, 2097.

Washington, Stevens County: Weaver, 1970.

Palladium.

Alaska, Prince of Wales Island: Campbell, 278; Mertie, 1284.

Panama (including Canal Zone).

Economic geology.

Manganese ore, Boqueron River: Sears, 1643.

Historical geology.

Boqueron River: Sears, 1643.

General: MacDonald, 1170, 1171; Vaughan, 1910.

Tertiary: Vaughan, 1907.

Paleontology.

General: Vaughan, 1910.

Panama (including Canal Zone)—Continued.

Physical geology.

Earthquakes: Kirkpatrick, 1012.

Paraffin dirt, Gulf coast oil fields: Brokaw, 201; Shaw, 1681.

Paragenesis of minerals.

British Columbia, Hazleton: O'Neill, 1390.

Illinois, Hardin County: Weller, 1973.

Parasitic disease: Bather, 102.

Parasitism.

Carboniferous crinoids: Moodie, 1335.

Pawpaw formation, Texas Comanchean: Adkins, 6.

Peat: Cottrell, 413; Dachnowski, 439, 440; Osbon, 1400; Soper, 1739.

Classification, peat deposits: Dachnowski, 440.

Dismal Swamp: Osbon, 1399.

Minnesota: Soper, 1739.

New Brunswick: Anrep, 33.

Ontario: Anrep, 34.

Origin: Talbot, 1812; Thiessen, 1828.

Quebec: Anrep, 34.

Pelecypoda.

Alberta, Peace and Smoky valleys, Coloradoan: McLearn, 1191.

Cretaceous, Alberta: McLearn, 1189.

Didymotis trinidadensis, Lower Cretaceous, Trinidad: Sommermeier, 1738.

Exogyra, Cretaceous, Texas: Böse, 162.

Lutetia and Alveinus: Harris, 807.

Ontario, Toronto: Stewart, 1765.

Pectinidae, Cretaceous, Texas: Kniker, 1021.

St. Maurice and Claiborne stages: Harris, 756.

Pelmatozoa, phylogeny and taxonomy: Jaekel, 894.

Penepains.

Appalachians, northern, Piedmont region: Barrell, 74.

Marine penepains: Barrell, 74.

Pleistocene penplain in Coastal Plain: Cleland, 365.

Perisphinctinae, costal development: O'Connell, 1383.

Pennsylvania.

Areas described.

Elkton quadrangle: Bascom, 86.

Economic geology.

Chromite deposits: Diller, 500.

Clay, Saylorsburg, Monroe County: Peck, 1459.

white: Hice, 816.

Coal: Ashley, 43; low-sulphur: Chance, 324.

Fire clays, northern Appalachian coal basin: Ashley, 44; Lovejoy, 1136.

Glass sand: Fettke, 588.

Petroleum: Johnson, 940.

Salt deposits: Phalen, 1469.

Historical geology.

Allegheny formation, typical section: Swartz, 1803.

Northwestern Pennsylvania: Decker, 483.

Ordovician, central Pennsylvania: Field, 590.

Triassic sediments, Gettysburg area: Stose, 1787.

Mineralogy.

Chester County: McKinstry, 1182.

Columbite, Boothwyn: Smith, 1723.

Epidesmene, Berks County: Gordon, 676.

Glauberite crystal cavities in Triassic, Gettysburg area: Stose, 1787.

Limonite pseudomorphous after pyrite, York County: Holden, 892.

Monazite, Boothwyn: Wherry, 1994.

Pyrite, French Creek: Wherry, 1996.

York: Jandorf, 898.

Paleontology.

Ordovician, central Pennsylvania: Field, 590.

Petrology.

Elkton quadrangle: Bascom, 86.

Physical geology.

Conglomeratic limestone, Nittany Valley: Eaton, 534.

Pennsylvania—Continued.

Physiographic geology.

- Glacial deposits: Williams, 2032.
 Kansan pondings: Williams, 2032.
 Subordinate ridges: Eaton, 533.
 Susquehanna deeps: Daly, 458.
 Pennsylvanian. *See* Carboniferous.
 Pentremites. *See* Blastoidea.
 Permian. *See* Carboniferous.
 Petroleum: Andros, 32; Lloyd, 1112; Logan, 1120; McBeth, 1155; Moore, 1345; Northrop, 1378, 1380; Panyity, 1435; Semmes, 1656; Smith, 1721; Van Tuyl, 1904; White, 2005; Ziegler, 2101.
 Accumulation: Mills, 1314; Washburne, 1954.
 Alabama, northern, oil possibilities: Semmes, 1656.
 Alberta: Coste, 411; Dowling, 518.
 Peace River: Rutledge, 1590.
 western: Purdy, 1501.
 Appalachian oil and gas fields, geology: Mills, 1313.
 Appalachian oil field: Reeder & Company, 1524.
 Appalachian region: Willis, 2047.
 Barometric surveying in petroleum mapping: Lahee, 1045.
 Bed rock, rôle in distribution of hydrocarbons: Monte-Flores, 1327.
 Berea sand, Ohio, lithology: Panyity, 1436.
 Bibliography: Burroughs, 241, 242.
 Brines of oil fields: Washburne, 1955.
 California: McLaughlin, 1185.
 Santa Clara Valley: Reinhard, 1539.
 Simi Valley: Kew, 979.
 Sunset-Midway field: Pack, 1415.
 Canada: Dowling, 519; western: Dowling, 520; Pearce, 1456.
 Carbon ratios in Carboniferous coals: Price, 1495; in Oklahoma coals: Fuller, 629.
 Cementation process in sandstone: Johnson, 941.
 Classification of undeveloped oil land for valuation: Beal, 106.
 Compendium: Ziegler, 2101.
 Conditions of occurrence: Harrison and Eaton, 761.
 Decline curves of various oil pools: Johnson, 1038.
 Deposition conditions of some Tertiary petroliferous sediments: Grabau, 681.
 Distribution: Van Tuyl, 1904.
 Drainage areas for production: Mather, 1226.
 Examination of well cuttings: Trager, 1858.
 Factors controlling oil accumulations: Lahee, 1044.
 Features of oil structures: Ziegler, 2102.
 Field work, surveying: Taylor, 1823.
 Gas, factor in accumulation: Thiel, 1824.
 Genesis: Mabery, 1152.
 Genetic factors of oil occurrence: White, 2004.
 Geographic distribution: Mehl, 1255.
 Geologic distillation: Willis, 2047.
 Geologic structure favorable for accumulation: Watts, 1968.
 Geology in relation to valuation: Arnold, 39.
 Gulf coast: Lucas, 1141, 1142; McBeth, 1154; salt domes: Hill, 828; Wolf, 2072.
 Illinois: Barrett, 84.
 Colchester and Macomb quadrangles: Hinds, 832.
 Crawford County, Flat Rock pool: Tough, 1854.
 Trenton field: DeWolf, 497.
 Indiana: Barrett, 79; Pownocker, 184; Logan, 1120; Wright, 2081.
 Sullivan County field: Visser, 1920.
 Kansas: Moore, 1349, 1351; Snider, 1736.
 Allen and Neosho counties: Moore, 1347.
 map of oil and gas fields: U. S. Geol. Survey, 1895.
 oil domes, origin: Blackwelder, 153.
 Wilson and Montgomery counties: Moore, 1348.
 Kentucky: Glenn, 663; Jillson, 903, 906, 922, 924; Leonard, 1085.
 Allen County: Jillson, 913; Miller, 1297; Shaw, 1680.
 Barren County: Butts, 259.
 Breathitt and Knox counties: Jillson, 914.
 eastern, pay oil sands: Jillson, 918; Wier sand: Jillson, 917.

Petroleum—Continued.

Kentucky—Continued.

Irvine district: St. Clair, 1591.

Johnson County, Paint Creek uplift: Rhodes, 1541.

southeastern: Jillson, 910.

Warren County: Jillson, 919.

Louisiana: Snider, 1736.

Red River field: Bates, 100.

Sabine uplift: Powers, 1483.

Mexico: Iglesias, 888; Shaw, 1682.

islands in Gulf of California: Paredes, 1446.

Tamaulipas, Ordoñez, 1396, 1397.

Mid-Continent oil fields: Bosworth, 169; Snider, 1736.

Montana: Rowe, 1583, 1584.

New Mexico: Ellis, 545; Knox, 1031, 1032.

Chaves County: Merritt, 1280.

New York: Johnson, 940.

Notebook and symbols for petroleum geologists: Woodruff, 2076.

Ohio: Bownocker, 184.

Oil, gas, and water, relations in Sunset-Midway field, California: Rogers, 1566.

Oil deposits, surface indications: Pearson, 1458.

Oil domes, central Kansas, origin: Blackwelder, 153.

Oil-field geology: Hager, 729.

Oil-field waters: Rogers, 1567; Gulf coast: Rogers, 1571.

Oil pools, relation to ancient shore lines: Jones, 953; Lahee, 1046.

Oil to carbon ratio, Alabama: Lloyd, 1113.

Oklahoma: Shannon, 1659; Snider, 1736.

Cement field, Caddo County: Clapp, 340.

Healdton field: Merritt, 1279.

Kay County: Aurin, 50.

Osage County, folds: Millikan, 1312.

Osage Nation: Mason, 1224.

Osage Reservation: Goldman, 665, 667; Heald, 777-780; Hopkins, 854; Robinson, 1559, 1560; Ross, 1578.

unconformities: Bloesch, 155.

Ontario: Williams, 2037.

future prospects: Williams, 2036.

Kent County: Williams, 2039.

southwestern: Williams, 2035, 2038.

Origin: Moore, 1345; Semmes, 1656; Washburn, 1953; in swamp muds: MacDon-ald, 1172.

Paraffin dirt, Gulf coast oil fields: Brokaw, 201.

Pennsylvania: Johnson, 940.

Petroleum hydrology, Mid-Continent field: Neal, 1366.

Petroliferous provinces: Mehl, 1259; Schuchert, 1632; Woodruff, 2075.

Pore space of oil and gas sands: Melcher, 1261.

Principles of accumulation: McCoy, 1166.

Projecting structure through an angular unconformity: Corbett, 408.

Prospecting: Panyity, 1435.

Relation to carbon values in north Texas: Fuller, 628.

Rock classification: Knapp, 1014.

Sand porosity: McCoy, 1168.

Sea beach observations: Kemp, 971.

Seismographic method for underground observations: Udden, 1886.

Source and origin of salt-dome oil: Lucas, 1141.

Stratigraphy and paleogeography, relations to petroleum geology: Schuchert, 1628.

Structural features for oil accumulation: Ziegler, 2102.

Submarine deposits: Urbina, 1898.

Subsurface relations in oil and gas fields: McCoy, 1168; Mills, 1314.

Symbols for drilling operations: Mehl, 1257.

Tennessee: Glenn, 663.

northern: Nelson, 1373.

Overton County: Butts, 258.

Texas: Snider, 1736; Udden, 1884.

Bend series water problems: Fuller, 626.

Bexar County: Sellards, 1650, 1653.

central: Matteson, 1231.

Petroleum—Continued.

Texas—Continued.

- Coke County: Beede, 108.
- eastern: Dumble, 524.
- Eastland and Stephens counties: Adams, 1.
- Marathon fold: Liddle, 1101.
- north central: Hager, 730.
- northern: Roberts, 1556; Wheeler, 1989, 1990.
- Palangana salt dome: Barton, 85.
- Trinidad: Macready, 1195.
- Water displacement in oil and gas sands: Johnson, 939.
- Water in oil fields: Ambrose, 29.
- Waters associated with petroleum and natural gas: Mills, 1313.
- West Virginia: Reger, 1529.
- Fayette County: Hennen, 797.
- Webster County: Reger, 1528.
- Wyoming: Wegemann, 1971.
- Lance Creek field: Hancock, 737.
- Maverick Springs: Collier, 389.
- Mule Creek oil field: Hancock, 736.
- Thermopolis district: Collier, 387.
- Upton-Thornton oil field: Hancock, 735.

Petrology (general). *For regional, see names of States. For rocks described, see list.*

- p. 244. *See also* Igneous and volcanic rocks; Sedimentary rocks; Technique.
- Bend series sediments: Waite, 1924.
- Chemical analysis of rocks: Washington, 1956.
- Deformation of crystallizing magma: Bowen, 178.
- Feldspar determination of metamorphic rocks: Carlson, 295.
- Feldspars as indicators of origin: Steidtmann, 1759.
- Igneous rock textures, experiments illustrating: Wright, 2086.
- Igneous rocks: Iddings, 885.
- classification: Mathews, 1228.
- density determination from norm: Iddings, 886.
- quantitative mineralogical classification: Johannsen, 928.
- Movements in crystallizing magmas: Grout, 719.
- Phenocrysts in granitic intrusions: Hess, 802.
- Planimeter determination of percentage composition: Johannsen, 927.
- Rock classification for engineering: Pirsson, 1473; Smith, 1729.
- Rosin method for determining minerals: Johannsen, 926.
- Silixite, Miller, 1306.
- Silicate and carbonate rocks, analysis of: Hillebrand, 830.
- Table for determining common rocks: Lane, 1052.
- Tactite: Hess, 799.
- Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks: Benson, 122.
- Phosphate: Grabau, 682; Stone, 1780.
- Canada: Spence, 1745.
- Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
- Phosphate rock an economic army: Stone, 1775.
- Physical geology (general). *For regional, see names of States.*
- Desert phenomena, San Luis Potosi: Wittich, 2064.
- Discoidal structure of the lithosphere: Willis, 2045, 2049.
- Dust fall, March 9, 1918: Winchell, 2057.
- General: Keyes, 1000.
- Geochemistry, data: Clarke, 348.
- Geotectonic adaptation through retardation of the earth's rotation: Keyes, 987.
- Ice, physical properties: Matsuyama, 1230.
- Joint planes, formation: Wright, 2085.
- Mechanical interpretation of joints: Bucher, 223.
- Mechanics of geologic structures: Mead, 1252.
- Mechanics of vein formation: Taber, 1805.
- Migration of geosynclines: Grabau, 680.
- Minor folds: Decker, 483.
- Mississippian orogenic movements: Van Tuyl, 1802.
- Ocean basin, origin: Willis, 2049.
- Planetary nuclei, physical phases: Chamberlin, 321.
- Planetesimal growth: Chamberlin, 322.

- Physical geology (general)—Continued.
- Post-glacial uplift of New England coastal region, Fairchild, 563.
- Quartz in veins, genesis: Bancroft, 64.
- Rounding of sand grains by solution: Galloway, 634.
- Sand grains, rounding by sea urchins: Kindel, 1004.
- Sea beach observations: Kemp, 971.
- Selective segregation of material forming earth: Chamberlin, 320.
- Shore processes: Johnson, 931.
- Shrinkage of the earth: Chamberlin, 319.
- Tectonic adjustment of a rotating stratified spheroid: Keyes, 982.
- Tectonic conditions accompanying intrusion of basic and ultra-basic igneous rocks: Benson, 122.
- Thrust faulting, process: Quirk, 1506.
- Uphrust faulting: Willis, 2044.
- Vein formation: Taber, 1805.
- Wedge work of roots: Thomas, 1833.
- Physiographic geology (general). *For regional, see names of States. See also Drainage changes.*
- Block diagrams: Lobeck, 1114.
- Cordilleran region: Keyes, 1001.
- Distribution of land and water on the earth: Reid, 1534.
- Fall Line: La Forge, 1041.
- Flood plains, head of: Tilton, 1848.
- Hornitos: Sapper, 1599.
- Hudson submarine channel: Daly, 458.
- Inclination of surface, determination from contour map: Rich, 1543.
- Mississippi delta: Malott, 1205.
- Mountain-glacier erosion, types: Hobbs, 836.
- Mountain pediments: Bryan, 219.
- Pleistocene peneplain in Coastal Plain: Cleland, 365.
- Relief shading of topographic maps: Matthes, 1232.
- Textbook: Salisbury, 1593.
- Unitine: Grabau, 687.
- Piedmont terraces, northern Appalachians: Barrell, 74.
- Pine Creek district, Idaho: Jones, 944.
- Pisces.
- California, Lompoc: Jordan, 955.
- southern: Jordan, 954.
- Cestracient spine, Triassic, Nevada: Davidson, 466.
- Cretaceous fish scales: Cockerell, 366.
- Cuba, Squalidae, Tertiary: Sanchez Roig, 1597.
- Devonian: Hussakof, 884.
- Eusthenopteron, structure: Bryant, 221.
- Florida, Pleistocene: Hay, 764.
- New York, western, Devonian: Hussakof, 884.
- Xyne, Santa Barbara County, California: Jordan, 956.
- Plane-table: Bateman, 96.
- Planetary nuclei, physical phases: Chamberlin, 321.
- Planetesimal growth: Chamberlin, 322.
- Planetesimal hypothesis: Daly, 456.
- Plants, fossil. *See Paleobotany.*
- Platinum: Hill, 819, 821, 823; Uglow, 1888.
- Alaska, Chistochina region: Chapin, 330.
- Kahiltna Valley: Mertie, 1282.
- Kiwalik-Koyuk region: Harrington, 755.
- Prince of Wales Island, Salt Chuck mine: Mertie, 1284.
- Tolstoi district: Harrington, 752.
- Bibliography: Howe, 871.
- British Columbia: Cammell, 285; Uglow, 1889.
- Tulameen district: Macaulay, 1153.
- California: Logan, 1115.
- Canada: Mackenzie, 1181; O'Neill, 1391.
- Nova Scotia, western: Faribault, 571.
- Oregon, Josephine County, Waldo district: Kellogg, 969.
- Pleistocene. *See Glacial geology; Quaternary.*
- Pliocene. *See Tertiary.*
- Polarized light in the study of ores and metals: Wright, 2083.

220 BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1919-1920.

- Political and commercial geology: Spurr, 1750.
 Polyzoa. *See* Bryozoa.
 Portland cement. *See* Cement materials.
 Porto Rico.
 Geology: Berkey, 124.
Areas described.
 Coamo-Guayama district: Hodge, 837.
 San Juan district: Semmes, 1655.
Economic geology.
 Limonite deposits, Mayaguez Mesa: Fettke, 589.
Historical geology.
 Tertiary formations: Hubbard, 877; Maury, 1250; correlation: Maury, 1248.
Paleontology.
 Tertiary Mollusca: Hubbard, 876; Maury, 1250.
Physical geology.
 Earthquakes: Reid, 1530, 1531; October-November, 1918: Reid, 1532.
 Potash: Gale, 631; Hicks, 817, 818.
 Bibliography: Gale, 631; Hicks, 817, 818.
 Cuba, Santa Clara: Montolieu, 1330.
 Georgia, Cartersville slates: Maynard, 1251.
 New Jersey, greensands: Mansfield, 1209, 1210, 1215.
 Nova Scotia, Cumberland County: Hayes, 775.
 Oregon: Nattress, 1365.
 Pre-Cambrian.
 Arctic regions, Ellesmere Land: Høltedahl, 850.
 Arizona, Jerome district, Yavapai County: Reber, 1522.
 Ray-Miami region: Ransome, 1507.
 Tucson and Amole Mountains: Jenkins, 901.
 Canada, Arctic regions: Moore, 1342.
 Canadian Rockies: Burwash, 249.
 Colorado, north central, foothills formations: Henderson, 795.
 Twin Lakes district: Howell, 874.
 Delaware, Wilmington quadrangle: Bascom, 86.
 Georgia: McCallie, 1159.
 Greenland, northwestern: Koch, 1033.
 Idaho, Coeur d'Alene district: Shannon, 1673.
 Pine Creek district: Jones, 944.
 Literature: Steidman, 1760.
 Mackenzie River basin: Camsell, 281.
 Manitoba, Cross-Pipestone area: Alcock, 13.
 Falcon Lake district: DeLury, 489.
 Knee Lake district: Bruce, 210.
 northern: Bruce, 211; Hanson, 744.
 Reed and Wekusko lakes region: Alcock, 10.
 Reed-File lakes area: Alcock, 11.
 Reed Lake-Elbow Lake: Bruce, 208.
 Wekusko Lake area: Alcock, 12.
 Maryland, Elkton quadrangle: Bascom, 86.
 Michigan, Huronian formations: Allen, 25.
 Minnesota: Grout, 715.
 east Mesabi district: Broderick, 197.
 eastern Mesabi range: Grout, 716.
 Gunflint district: Broderick, 198.
 New Brunswick: Bailey, 52.
 Newfoundland, southeastern: Buddington, 226.
 New Mexico: Keyes, 993.
 Taos Range: Gruner, 720.
 New York, Adirondacks: Alling, 28.
 Lake Clear region: Alling, 26.
 Lake Placid quadrangle: Miller, 1303.
 Schroon Lake quadrangle: Miller, 1304.
 North Dakota: Leonard, 1082.
 Ontario: Miller, 1300, 1304.
 Abitibi-Mattagami area: Cross, 422.
 Argonaut gold mine: Knight, 1020.
 Ben Nevis area: Knight, 1019.
 Cobalt: Whitehead, 2010.

Pre-Cambrian—Continued.

Ontario—Continued.

- Gowganda area: Burrows, 245.
- Haileyburian intrusives: Miller, 1302.
- Kirkland Lake area: Burrows, 246.
- Lake Superior region: Tanton, 1815.
- Lightning River area: Burrows, 243.
- Matachewan district: Burrows, 244; Cook, 401.
- Michipicoten district: Collins, 390.
- northern: Cooke, 407.
- Patricia: Burwash, 248.
- Timiskaming district, Abitibi-Night Hawk gold area: Knight, 1015.
- West Shiningtree area: Hopkins, 856.
- Windy Lake region: Knight, 1018.

Oregon: Smith, 1728.

Quebec: Cooke, 407.

- Amherst township: Wilson, 2051.
- Coleraine area: Knox, 1030.
- Harricaw-Turgeon basin: Tanton, 1813.
- Lake Demontigny region: Mailhot, 1202.
- northern: Cooke, 403.
- South Dakota, Black Hills: Runner, 1598.
- Steep Rock series: Rothpletz, 1582.
- Utah: Butler, 255.
- Vermont, Northfield: Richardson, 1545.
- Rochester quadrangle: Foye, 620.
- Virginia, Blue Ridge, west foot: Stose, 1786.

Precious stones: Schaller, 1609.

Pribilof Islands, Alaska: Hanna, 741.

Prince Edward Island.

Historical geology.

Glacial history: Coleman, 379.

Projecting structure through an angular unconformity: Corbett, 408.

Primates. *See* Mammalia.

Pseudomorphs.

- Bismuthinite after molybdenite: Graham, 692.
- Colemanite after inyoite, Death Valley, California: Rogers, 1562.
- Hematite after goethite: Spencer, 1746.
- Limonite after pyrite: Holden, 842.

Pursell trench, origin: Schofield, 1619.

Pyrite: Smith, 1727.

- Colorado, Leadville: Lee, 1065.
- Illinois, coal beds: Cady, 269.
- Indiana: Barrett, 82.
- New York, Jefferson and St. Lawrence counties: Buddington, 224.
- Ohio coal fields: Tucker, 1866.
- Ontario, Calabogie district: Wilson, 2053.
- Michipicoten district: Collins, 390.
- Ottawa Valley: Wilson, 2053.
- Tennessee, coal pyrite: Holbrook, 841.

Pyrrhotite.

- New York, Jefferson and St. Lawrence counties: Buddington, 224.

Quartz, microscopic study: Adams, 5.

Quaternary. *See also* Glacial geology; Paleontology, Quaternary.

- Alaska, Anvik-Andreafski region: Harrington, 801.
- Kantishna region: Capps, 291.
- Kodiak Island: Maddren, 1198.
- northern, Canning River region: Leffingwell, 1074.
- Porcupine district: Eakin, 530.
- Atlantic Coastal Plain, Pleistocene: Hay, 765.
- British Columbia, Vancouver Island, Barkley Sound: Dolmage, 506.
- California, Rancho La Brea: Wyman, 2092.

San Diego County: Ellis, 542.

Colorado, Platoro-Summitville district: Patton, 1454.

Delaware, Wilmington quadrangle: Bascom, 86.

Florida: Sellards, 1647, 1648.

Everglades section: Sellards, 1646.

Vero deposits, age: Chamberlin, 318.

Quaternary—Continued.

- Georgia: McCallie, 1159.
 Greenland: Bøggild, 157.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 Illinois, Colchester and Macomb quadrangles: Hinds, 882.
 Kansas: Moore, 1346.
 Syracuse and Lakin quadrangles: Darton, 462.
 Kentucky: Miller, 1293.
 Louisiana, Port Hudson beds: Emerson, 549.
 Maryland, Elkton quadrangle: Bascom, 86.
 Minnesota, Herman, Barrett, Chokio, and Morris quadrangles: Sardeson, 1600.
 Mississippi: Lowe, 1138.
 New Mexico: Keyes, 993.
 northeastern: Garrett, 640.
 Oregon: Smith, 1728.
 Pleistocene history: McCornack, 1165.
 Pleistocene: Hay, 769.
 Pleistocene deposits, age: Hay, 767.
 Porto Rico, Coamo-Guayama district: Hodge, 837.
 South Dakota, Newell quadrangle: Darton, 461.
 Texas, Bexar County: Sellards, 1653.
 Dallas County: Shuler, 1696.
 eastern: Dumble, 524.
 Utah: Butler, 255.

Quebec.

Areas described.

- Amherst township: Wilson, 2051.
 Coleraine sheet: Knox, 1030.
 Harricaw-Turgeon basin, northern Quebec: Tanton, 1813.
 Lemieux, Gaspé County: Mailhot, 1199.
 Mount Albert, Gaspé County: Mailhot, 1200.

Economic geology.

- Apatite deposits: Spence, 1745.
 Asbestos: Lynch, 1151.
 Eustis mine: Hanson, 7444.
 Gaspesia zinc and lead deposits: Beidelman, 112.
 Gold, Lake Demontigny: Mailhot, 1202.
 Graphite: Brumell, 213; Buckingham district: Brumell, 214.
 Harricaw River gold area: Mailhot, 1201.
 Huntingdon copper deposit, Eastman: Hore, 858.
 Iron, Belcher Islands, Hudson Bay: Moore, 1341.
 Kaolin, Amherst township: Wilson, 2051.
 Kienawisik gold district: Tanton, 1813.
 Lacorne, Abitibi, molybdenite deposits: Mailhot, 1204.
 Mining operations, 1918, 1919: Denis, 491, 492.
 Peat bogs: Anrep, 34.
 Road materials, Montreal district: Gauthier, 641.
 Vaudreuil County: Picher, 1471.
 Serpentine belt: Knox, 1030.
 Thetford-Black Lake district: Knox, 1030.
 Zinc and lead, Gaspé Peninsula: Mailhot, 1203.

Historical geology.

- Anticosti: Twenhofel, 1873.
 Bonaventure conglomerate, Gaspé: Clarke, 356.
 Glacial history, Magdalen Islands: Coleman, 379.
 Lake Demontigny region: Mailhot, 1202.
 Percé, geologic map: Clarke, 350.
 Pre-Cambrian, correlation: Cooke, 407.
 northern Quebec: Cooke, 403.
 Serpentine belt: Knox, 1030.
 Thetford-Black Lake district: Knox, 1030.

Mineralogy.

- Albite, titanite, and scapolite, crystallography: Poitevin, 1477.
 Cacoclasite, Wakefield: Bowen, 176.

Paleontology.

- Eusthenopteron, Scaumenac Bay: Bryant, 221.
 Foraminifera, Bonaventure chert, Gaspé: Bagg, 51.

Quebec—Continued.

Petrology.

- Hornblendite, Cantley: Stansfield, 1754.
Lemieux, Gaspé County: Mailhot, 1199.
Mount Albert, Gaspé County: Mailhot, 1200

Physical geology.

- Landslide, Portneuf County: Wilson, 2052.

Physiographic geology.

- Gaspé driftless area: Coleman, 380.
Quicksilver: McCaskey, 1161; Ransome, 1508, 1509.
Anticlinal theory: Udden, 1879, 1883.
Bibliography: Evans, 554, 555.
British Columbia, Kamloops Lake: Camsell, 282.
Vancouver Island, Barkley Sound: Dolmage, 506.
Idaho: Livingston, 1110.
Black Pine: Larsen, 1057.
Yellow Pine district: Larsen, 1059.
Mexico, San Luis Potosi, Guadalcazar: Wittich, 2067, 2069.
Oregon, Jackson County: Kellogg, 968.
Texas: Udden, 1879.

- Racine formation, Northern Peninsula, Michigan: Ehlers, 541.

- Radian measures in plane-table mapping: Palmer, 1433.

- Radium: Hess, 800, 805, 806; Penrose, 1460.

- Colorado, Gateway district, carnotite ores: Farnum, 573.

- Ontario, Butt township, pitchblende: Hore, 862; Knight, 1017.

- Rare earths: Schaller, 1611.

Relief maps.

- Canada, Prairie provinces: Dowling, 513.

- Idaho: Varley, 1906.

- Lake Superior region: Winchell, 2058.

- Oregon, western: Harrison and Eaton, 761.

- Rocky Mountain region: Butler, 255.

- Washington: Leighton, 1075.

Reptilia.

- Alberta: Parks, 1450.

- Amphicoelias: Osborn, 1406.

- Antrodemus: Gilmore, 658.

- Barosaurus: Lull, 1145; Wieland, 2029.

- California, Mohave Desert: Merriam, 1264.

- Camarasaurus: Gregory, 709; Osborn, 1406, 1407, 1408.

- Ceratosaurus: Gilmore, 658.

- Desmatosuchus, Triassic, Texas: Case, 303.

- Dimetrodon gigas: Gilmore, 655.

- Dinosaur, ornithomimid, Arundel formation, Maryland: Gilmore, 657.

- Dinosauria: McKelvey, 1180.

- Alberta: Matthew, 1246.

- carnivorous: Gilmore, 658.

- evolution: Matthew, 1238.

- Dromopus? woodworthi: Lull, 1148.

- Edmontosaurus, Alberta: Lambe, 1049.

- General: Ballou, 63.

- Kritosaurus, Belly River formation: Parks, 1451, 1452.

- New Mexico, San Juan County, Eocene and Upper Cretaceous: Gilmore, 656.

- Panoplosaurus, Belly River beds, Alberta: Lambe, 1050.

- Phytosaurus, Triassic, Texas: Case, 303.

- Pterodactyls: Matthew, 1241.

- Stylernys nebrascensis, South Dakota: Case, 301.

- Triceratops: Gilmore, 653.

- Turtles: Gilmore, 654.

Restorations.

- Aletomeryx: Lull, 1147.

- Antrodemus: Gilmore, 658.

- Brachosaurus: McKelvey, 1180.

- Camarasaurus: Osborn, 1407.

- Ceratosaurus: Gilmore, 658.

- Dimetrodon gigas: Gilmore, 655.

Restorations—Continued.

- Eusthenopteron : Bryant, 221.
 Helderberg fauna : Clarke, 352.
 Mammalia, Black Hills region : O'Harra, 1399.
 Pterodactyls : Matthew, 1241.
 Quaternary vertebrates : Osborn, 1409.
 Triceratops : Gilmore, 653.
 Trilobite, ventral surface : Raymond, 1520.

Rhode Island.

Economic geology.

- General : Thomas, 1836.

Historical geology.

- Dighton conglomerate, origin : Perkins, 1462.

Physiographic geology.

- Postglacial river changes : Brown, 205.
 Postglacial uplift : Fairchild, 562.

Rigidity of the earth : Michelson, 1291.

Ripple mark : Bucher, 222.

Road materials.

- Arkansas : Branner, 189.
 Mississippi : Lowe, 1140.
 New Hampshire : Goldthwait, 670.
 Ontario, eastern : Picher, 1472.
 Quebec, Montreal district : Gauthier, 641.
 Vaudreuil County : Picher, 1471.
 Saskatchewan, Regina area : Reinecke, 1536.
 Texas : Nash, 1364.
 Washington : Leighton, 1075.

Rochester quadrangle, Vermont : Foye, 620.

Rock classification for engineering : Pirsson, 1473 ; Smith, 1729.

Rock products and the war : Loughlin, 1130.

Rock rivers : Bailey, 54.

Rock slides. *See* Landslides.

Rock tanks and charcos, origin : Bryan, 215.

Rocks. *See* Igneous and volcanic rocks ; Sedimentary rocks.

Rocks, structural features.

- Coquina, Florida : Brodie, 199.
 Ice crystals, fossil : Udden, 1878.
 Ripple mark : Bucher, 222.

Rocks described. *See* list p. 244.

Rounding of sand grains by solution : Galloway, 634.

Roxbury, Vermont, terranes : Richardson, 1546.

Sabine uplift, Louisiana : Powers, 1483.

St. Bartholomew.

Paleontology.

- Tertiary calcareous Algae : Howe, 872.

Salmon River district, British Columbia : O'Neill, 1393.

Salt : Stone, 1779.

- Canada : Cole, 377, 378.

- Deposition, principles : Grabau, 688.

- Gulf coast salt domes : Wolf, 2072.

- Mexico, Colima, Cuyutlan area : Paredes, 1444.

- Nova Scotia, Malagash, Cumberland County : Cole, 376, 378 ; Hayes, 772, 775.

- Origin : Phalen, 1469.

- United States : Phalen, 1469.

Salt deposition, principles : Grabau, 688.

Salt domes : Brantley, 191 ; Wolf, 2072.

- Origin : Rogers, 1569 ; Wolf, 2072 ; intrusive origin, Gulf coast : Rogers, 1568.

- volcanic origin theory : DeGolyer, 486.

- Salt cores, origin : Washburne, 1955.

- Stratigraphy, Gulf Coastal Plain : Shaw, 1683.

- Structure : Lucas, 1141.

- Texas, Butler salt dome : Powers, 1484.

- Palangana salt dome : Barton, 85.

- West Point salt dome : DeGolyer, 485.

Salts, natural : Grabau, 688.

Salvador.

Physical geology.

San Salvador, eruption: Friedlander, 623.

Sand: Stone, 1777, 1781.

Indiana, molding sand: Hole, 846.

Missouri: Dake, 441.

Nebraska: Condra, 396.

Ontario: Ledoux, 1063.

Rounding of sand grains by solution: Galloway, 634.

Sand chrome ore, Maryland: Singewald, 1709.

Sand grains, rounding by sea urchins: Kindle, 1004.

Sandstone.

Cementation in sandstone: Johnson, 941.

Santo Domingo. *See* Dominican Republic.

Saskatchewan.

Economic geology.

Lignite: MacLean, 1186.

Road materials, Regina area: Reinecke, 1536.

Southeastern Saskatchewan: Stansfield, 1752.

Historical geology.

Athabaska series: Alcock, 14.

Borings: Dowling, 515.

Correlation: Dowling, 514.

Surface deposits, southeastern Saskatchewan: Stansfield, 1752.

Physiographic geology.

Lake Athabasca, origin: Alcock, 15.

Seasonal deposition in aqueo-glacial sediments: Sayles, 1606.

Sedimentary ripples: Bucher, 222.

Sedimentary rocks.

Bend and Ellenburger limestones, microscopic characters: Udden, 1881.

Bend series sediments: Waite, 1924.

Examination of well cuttings: Trager, 1858.

Feldspars: Carlson, 295.

Sedimentation: Louderback, 1125; Shaw, 1684, 1689; Vaughan, 1917.

Abstraction of potassium during sedimentation: Watson, 1959.

Algal deposits: Twenhofel, 1869.

Banded clays: Sayles, 1606.

California, San Francisco Bay: Louderback, 1125.

Chemical researches on sediments: Morwin, 1288.

Diagenesis: Schuchert, 1636.

Differential compression of sediments: Mehl, 1258.

Dighton conglomerate, origin: Perkins, 1462.

Inequalities of sedimentation: Kindle, 1005.

Ripple mark: Bucher, 222.

Seismology. *See also* Earthquakes.

Azimuth determination in earthquakes: Urrutia, 1899.

General: Townley, 1857.

Geologic theory of earthquakes: Montessus de Ballore, 1328.

Hawaiian lava column, seismometric investigation: Jagger, 896.

Interior of the earth, nature: Adams, 2.

Mexico: Muñoz Lumbier, 1359.

Monthly reports: Humphrey, 882.

Problems: Reid, 1535.

Propagation of earthquake waves: Williamson, 2048.

Seismograph, Chicago: Hibbard, 814.

long-period: Romberg, 1573.

nontilt: Romberg, 1574.

Status of seismological work: Klotz, 1013.

Selenium: Cahen, 272; Hill, 870, 874.

Serpulites, hydrozoan affinities: Price, 1494.

Shale.

Illinois, Colchester and Macomb quadrangles: Hinds, 832.

Minnesota: Grout, 714.

Ontario, Abitibi and Mattagami rivers: Keele, 966.

Virginia: Ries, 1555.

Shingle: La Forge, 1042.

Shore lines: Johnson, 932. *See also* Beaches; Terraces.

Development: Johnson, 932.

Michigan, Elsie and Perrinton quadrangles: Leverett, 1090.

Shore processes: Johnson, 932.

Shrinkage of the earth: Chamberlin, 319.

Silica: Katz, 958.

New York: Colony, 392.

Silurian. *See also* Paleontology, Silurian.

Acadia: Bailey, 53.

Arctic regions, Ellesmere Land: Høltedahl, 850.

Arkansas: Miser, 1319.

Georgia: McCallie, 1159.

Greenland: Bøggild, 157.

northwestern: Koch, 1033.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

Illinois, Orchard Creek shale: Savage, 1602.

Kentucky: Miller, 1293.

Allen County: Miller, 1297; Shaw, 1080.

Barren County: Butts, 259.

Little River group delta: Matthews, 1234.

Manitoba, Hudson Bay region: Savage, 1603.

Massachusetts, Essex County: Foerste, 605.

Michigan, Northern Peninsula, Racine formation: Ehlers, 541.

Middle Siluric: Grabau, 686.

New Brunswick: Bailey, 52.

New Mexico: Keyes, 993.

eastern: Baker, 55.

New York, Catskill region: Jones, 951.

Rochester: Giles, 651.

Ohio: Foerste, 599.

Ontario, Hudson Bay region: Savage, 1603.

Lake Timiskaming: Hume, 881.

Mattagami and Abitibi rivers: Williams, 2041.

southwestern: Williams, 2034.

Tennessee, Sumner County: Mather, 1227.

Utah: Butler, 255.

Silver: Dunlop, 528; McCaskey, 1162; Wuensch, 2090.

Alaska: Martin, 1220.

Arizona: Heikes, 784, 786.

British Columbia, Ainsworth district: Schofield, 1619.

Salmon River district: O'Neill, 1393; Prior, 1496.

Slocan area: Bancroft, 66.

Stewart district: Dolmage, 508.

Stump Lake: Camsell, 287.

California: Yale, 2093, 2095.

Kern County, Randsburg: Carpenter, 297.

Central States: Dunlop, 527.

Colorado: Heikes, 790, 793.

Platoro-Summitville district: Patton, 1454.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Wardner district: Rickard, 1551.

Mexico, Sonora, Arizpe district: Montijo, 1329.

Montana: Gerry, 645; Heikes, 783.

Native silver, Nonesuch formation, Michigan: Nishio, 1375.

Nevada: Heikes, 782, 785.

Divide district: Sizer, 1710; Young, 2098.

Wonder, halogen salts: Young, 2099.

New Mexico: Henderson, 789, 792.

Mogollon district: Scott, 1641.

Ontario, Cobalt: Whitehead, 2010.

Gowganda area: Burrows, 245.

Silver Islet: Tanton, 1816.

Oregon: Yale, 2093, 2095.

Silver Islet, Lake Superior: Channing, 327.

South Dakota: Henderson, 788, 791.

Silver—Continued.

- Texas: Henderson, 789, 792.
- Utah: Butler, 255; Heikes, 781, 787.
- East Tintic district: Goodwin, 672.
- Tintic district: Lindgren, 1105.
- Washington: Gerry, 644, 646.
- Stevens County: Weaver, 1970.
- Wyoming: Henderson, 788, 791.
- Yukon, Mayo area: Cockfield, 370, 373; Johnson, 933.
- Twelvemile area: Cockfield, 371.

Singing sands: Fairchild, 565; Fippin, 595; Ledoux, 1064; Lake Michigan: Richardson, 1548.

Sink holes.

Kentucky, Allen County: Shaw, 1680.

Slate: Loughlin, 1133.

Vermont, Northfield: Richardson, 1545.

Slides. *See* Landslides.

Slocan area, British Columbia: Bancroft, 66.

Snake Creek fauna: Matthew, 1236.

Soapstone: Diller, 503.

Soda.

British Columbia, Clinton district: Reinecke, 1537.

Lillooet-Prince George region: Reinecke, 1538.

Sodium salts: Wells, 1979, 1980, 1981.

Soils.

Barbados: Harrison, 759.

Formation: Muir, 1357.

Indiana, Benton County: Jones, 950.

Carroll County: Erni, 552.

Cass County: Beals, 107.

Whitley County: Shiltz, 1690.

Wisconsin, Door County: Whitson, 2022.

Milwaukee County: Whitson, 2023.

North central: Whitson, 2021.

South Carolina.

Paleontology.

Mollusca, Miocene: Gardner, 639.

South Dakota.

Badlands: O'Harra, 1388.

Report of State geologist: Ward, 1944, 1947.

Areas described.

Newell quadrangle: Darton, 461.

Economic geology.

Chalk: Ward, 1946.

Gold, silver, copper, and lead: Henderson, 788, 791.

Gypsum: Stone, 1785.

Harding County, oil and gas possibilities: Ward, 1945.

Lignite: O'Harra, 1387.

Oil possibilities, southern margin of Black Hills: Morse, 1354.

Historical geology.

Black Hills pre-Cambrian: Runner, 1588.

Western South Dakota: Stanton, 1756.

White River Badlands: O'Harra, 1389.

Mineralogy.

Beryl crystal, Black Hills: Waldschmidt, 1933.

Columbite crystals, Black Hills: Waldschmidt, 1934.

Epsomite, Black Hills: Waldschmidt, 1935.

Isomorphous siderite and calcite: Johnson, 935.

Water pool calcite, Black Hills: Johnson, 936.

White River Badlands: O'Harra, 1389.

Paleontology.

Barosaurus, Black Hills: Lull, 1145.

Cannonball fauna: Stanton, 1756.

Entelodonts: Troxell, 1865.

Felidae, White River beds: Thorpe, 1842.

Stylemys nebrascensis: Case, 301.

South Dakota—Continued.

Physical geology.

Caves, Black Hills: Johnson, 937.

Physiographic geology.

General: Visher, 1919.

Underground water.

Black Hills: Darton, 463.

Newell quadrangle: Darton, 461.

Spongiae.

Armstrongia, Devonian glass sponge: Clarke, 355.

Cambrian, British Columbia: Walcott, 1932.

Glass-sponge colonies: Clarke, 357.

Silicispongiae, Cretaceous: O'Connell, 1382.

Springs, classification: Bryan, 216.

Stanford hematite deposits, Montana: Westgate, 1985.

Stone: Loughlin, 1132, 1135.

Monumental stones: Dale, 448.

Strategy of minerals: Smith, 1716.

Stratigraphic. *See* Historical geology.

Stream capture.

Alaska, Tolovana and Hess River basins: Mertie, 1281.

Indiana, southern, Knobstone region: Malott, 1207.

Kentucky, Floyd County: Jillson, 905.

Stromatoporoidea.

Aulacera: Schuchert, 1626.

Beatrice: Schuchert, 1626.

Strontium: Stose, 1790, 1793.

Structural geology. *See* Physical geology.Structural materials. *See* Building stone; Clay, etc.Study and teaching. *See* Educational.

Subordinate ridges, Pennsylvania: Eaton, 533.

Subsidence. *See* Changes of level.Subterranean water. *See* Underground water.

Sulphate minerals in ore deposits: Butler, 254.

Sulphur: Smith, 1727.

Alaska, Unalaska and Akun islands: Maddren, 1197.

Geological aspects of sulphur in coal: Ashley, 42.

Gulf coast salt domes: Wolf, 2072.

Mexico, San Luis Potosi, Cerritos: Wittich, 2068.

Origin: Henning, 798.

Sulphur compounds in coal, origin: Thiessen, 1826.

Volcanic sulphur, source: Papish, 1437.

Sunloch copper district, British Columbia: Dolmage, 507.

Surveys.

Arkansas: Branner, 188.

Canada, summary report, 1917, 1918: McInnes, 1175, 1176.

Connecticut: Conn. G. S., 397; Gregory, 704.

Florida, State geologist's report: Sellards, 1644.

History of State surveys: Merrill, 1273.

Idaho, report: Thomson, 1840.

Illinois, report 1916-17: DeWolf, 495.

Indiana, report: Barrett, 75, 80, 81; Logan, 1121.

Mexico: Paredes, 1445.

Mississippi, report, 1916-17: Lowe, 1137.

Missouri, report of State geologist: Buehler, 227.

National geological survey, functions and ideals: Ransome, 1510.

New Jersey, report of State geologist: Kümmel, 1036, 1038.

North Carolina, report 1917-18: Pratt, 1487.

South Dakota, report of State geologist: Ward, 1947.

Tennessee, report of State geologist: Nelson, 1370, 1371.

United States Geological Survey: Blackwelder, 152; Inst. Govt. Research, 891.

annual report, 1918-19, 1919-1920: Smith, 1715, 1720.

as a civic institution during the war: Paige, 1416.

mineral resources work: Bastin, 95.

reports: Smith, 1719.

Vermont, State geologist, report: Perkins, 1463.

Surveys—Continued.

Virginia, report 1916-17, 1918-19: Watson, 1960, 1967.

Wisconsin, report of director: Hotchkiss, 866.

Susquehanna deeps: Daly, 458.

Swamps.

Central America, coastal swamps: MacDonald, 1172.

Dismal Swamp: Osbon, 1399.

Symbols for drilling operations: Mehl, 1257.

Syracuse-Lakin folio, Kansas (no. 212): Darton, 462.

Tables of formations. See Geologic formations, tables.

Taconic system resurrected: Schuchert, 1625.

Tactite: Hess, 799.

Talc: Diller, 503.

High-grade talc for gas burners: Diller, 504.

North Carolina and Maryland: Diller, 504.

Vermont, Roxbury: Richardson, 1546.

Talkeetna Mountains, western, Alaska: Capps, 293.

Talus: La Forge, 1042.

Tantalum: Hess, 806.

Taos Range, New Mexico: Gruner, 720.

Technique.

Barometric surveying in petroleum mapping: Lahee, 1045.

Crystal structure model: Whitlock, 2017.

Dip components, graphic determination: Lahee, 1043; Palmer, 1432.

Dip needle, use: Aldrich, 18.

Goniometer, two-circle: Bascom, 88; Palache, 1417.

Inclination of surface, determination from contour map: Rich, 1543.

Logmeter: Burton, 247.

Measuring folded beds: Hewett, 813.

Mining geology methods at Butte, Montana: Billingsley, 149.

Model for demonstrating crystal structure: Whitlock, 2017.

Models for determining structure of bedded rocks: Mehl, 1256.

Notebook and symbols for petroleum geologists: Woodruff, 2076.

Ores and metals, examination in polarized light: Wright, 2084.

Plane-table: Bateman, 96.

Polarized light in the study of ores and metals: Wright, 2083.

Preparing mineral specimens: Levison, 1094.

Projecting structure through an angular unconformity: Corbett, 408.

Reconnaissance mapping: Fuller, 627.

Reflecting microscope: Davy, 476.

Seismographic method for underground observations: Udden, 1886.

Symbols for drilling operations: Mehl, 1257.

Telescopic alidade, manipulation: Mather, 1225.

Tectonic adjustment of a rotating stratificate spheroid: Keyes, 982.

Tellurium: Hill, 820, 824.

Tennessee.

State geologist, report: Nelson, 1370, 1371.

Areas described.

Rutherford County: Galloway, 633.

Economic geology.

Ball clays, western Tennessee: Schroeder, 1623.

Barite, eastern Tennessee: Gordon, 674.

Coal pyrite: Holbrook, 841.

Manganese: Crane, 415; Stose, 1792; Appalachian Valley: Stose, 1789.

Oil and gas resources, Sumner County: Mather, 1227.

Oil exploration, Sumner County: Nelson, 1372.

Oil fields: Glenn, 663; northern Tennessee: Nelson, 1373.

Oil possibilities, Overton County: Butts, 258.

Oil prospects, western Tennessee: Nelson, 1372.

Petroleum, Overton County: Butts, 258.

Historical geology.

Cove areas, east Tennessee: Gordon, 675.

Cretaceous: Berry, 129.

Devonian, western Tennessee: Dunbar, 525, 526.

Geologic map: Jenkins, 899.

Ordovician: Raymond, 1515.

Tennessee—Continued.

Historical geology—Continued.

- Overton County: Butts, 258.
 Reelfoot Lake district, western Tennessee: Nelson, 1372.
 Sumner County: Mather, 1227.
 Upper Cretaceous: Wade, 1922.
 Western Tennessee: Nelson, 1372; Schroeder, 1623.

Paleontology.

- Cretaceous flora: Berry, 129, 140.
 Devonian, western Tennessee: Dunbar, 525, 526.
 Pleistocene plants: Berry, 131.
 Pleistocene Vertebrata: Hay, 768.

Physical geology.

- Erosion feature in western clays: Schroeder, 1624.

Terraces.

- Connecticut, New Haven region: Ward, 1948.
 Marine terraces: Barrell, 74.
 New York, Cohoes quadrangle: Stoller, 1774.
 Mechanicsville: Stoller, 1773.
 Piedmont terraces, northern Appalachians: Barrell, 74.
 Vermont, Connecticut Valley: Fairchild, 557.

Tertiary. *See also* Paleontology, Tertiary.

- Alabama, Coastal Plain: Brantley, 191.
 Alaska, Chistochina region: Chapin, 330.
 Chulitna region, upper: Capps, 294.
 Kahlitna Valley: Mertie, 1282.
 Kantishna region: Capps, 291.
 Kiwalik-Koyuk region: Harrington, 755.
 Kodiak Island: Maddren, 1198.
 Nenana field: Martin, 1217.
 northern, Canning River region: Leffingwell, 1074.
 Pliocene: Dall, 451.
 Pribilof Islands: Hanna, 741.
 Talkeetna Mountains, western: Capps, 293.
 Tolstoi district: Harrington, 752.
 Alberta, southern and central: Slipper, 1612.
 southwestern: Stewart, 1766.
 Swan Hills, Lesser Slave Lake district: Allan, 20.
 Arctic regions, Ellesmere Land: Hottedhal, 850.
 Arkansas: Miser, 1319.
 British Columbia, Lillooet-Prince George region: Reinecke, 1538.
 Vancouver Island, Sunloch district: Dolmage, 507.
 Brandon lignite, age: Berry, 133.
 Bozeman beds, Rocky Mountain region: Keyes, 998.
 California, Eocene divisions: Clark, 341.
 Meganos group: Clark, 342.
 San Diego County: Ellis, 542.
 Santa Barbara County, Santa Ynez River district: Kew, 980.
 Simi Valley: Kew, 979.
 southern: Jordan, 954.
 Sunset-Midway field: Pack, 1415.
 Caribbean region: Vaughan, 1910.
 Colorado, Twin Lakes district: Howell, 874.
 Correlation: Vaughan, 1907, 1910.
 Caribbean region: Maury, 1250.
 Costa Rica: MacDonald, 1171.
 Dominican Republic: Cooke, 400.
 Florida: Cushman, 431; Sellards, 1647, 1648.
 Everglades section: Sellards, 1646.
 Georgia: McCallie, 1159.
 Greenland: Böggild, 157.
 Gulf Coastal Plain: Rogers, 1571; Shaw, 1683.
 Idaho, Fort Hall Indian Reservation: Mansfield, 1211.
 south central: Umpleby, 1893.
 southeastern: Mansfield, 1213.
 Kansas: Moore, 1346.
 Syracuse and Lakin quadrangles: Darton, 462.

Tertiary—Continued.

- Kentucky: Miller, 1293.
- Louisiana, Sabine uplift: Powers, 1483.
- Mackenzie River basin: Camsell, 281.
- Mississippi: Lowe, 1138, 1140.
- Montana, central: Bowen, 171.
- Huntley field: Hancock, 734.
- New Mexico: Keyes, 993; Knox, 1031.
- Alamosa Creek valley: Winchester, 2061.
- northeastern: Garrett, 640.
- Pecos Valley: Semmes, 1658.
- North Dakota: Leonard, 1082.
- western: Stanton, 1756.
- Oregon: Smith, 1728.
- western: Harrison and Eaton, 761.
- Paleocene, status and limits: Matthew, 1242.
- Panama, Canal Zone: MacDonald, 1170, 1171; Vaughan, 1910.
- Porto Rico: Berkey, 124; Hubbard, 877; Maury, 1248.
- Coamo-Guayama district: Hodge, 887.
- San Juan district: Semmes, 1655.
- Santo Domingo, Miocene formations: Maury, 1249.
- Southeastern United States: Vaughan, 1910.
- South Dakota, Black Hills region: O'Harra, 1389.
- Newell quadrangle: Darton, 461.
- western: Stanton, 1756.
- Tennessee, western: Schroeder, 1623.
- Texas: Udden, 1880.
- Amarillo region: Gould, 678.
- Bexar County: Sellards, 1653.
- Butler salt dome: Powers, 1484.
- eastern: Dumble, 524.
- Palangana salt dome: Barton, 85.
- West Point salt dome: DeGolyer, 485.
- Trinidad: Macready, 1195.
- Utah: Butler, 255.
- Washington, southwestern: Culver, 428.
- Stevens County: Weaver, 1970.
- Wyoming, Cody region: Hewett, 811.
- Fremont County, Big Sand Draw: Collier, 388.
- Lance Creek field: Hancock, 737.
- Rock Springs area, Sweetwater County: Schultz, 1639.

Texas.

- Chemical analyses of rocks and minerals: Schoch, 1614.
- Identification of geological formations: Udden, 1880.

Areas described.

- Bexar County: Sellards, 1653.
- Crockett County: Liddle, 1102.
- Dallas County: Shuler, 1696.
- Tarrant County: Winton, 2062.
- Terrell County: Christner, 339.

Economic geology.

- Bend series, water problems: Fuller, 626.
- Bexar County oil fields: Sellards, 1650.
- Chemical analyses of rocks and minerals: Schoch, 1614.
- Diablo Plateau: Beede, 110.
- Eastern Texas: Dumble, 524.
- Gold, silver, copper, lead, and zinc: Henderson, 789, 792.
- Gypsum: Stone, 1785.
- Lignite: Gentry, 642.
- Mid-Continent oil fields: Bosworth, 169.
- Natural gas: Snider, 1736.
- Natural gas resources, central north Texas: Shaw, 1685.
- North Texas oil fields: Roberts, 1556; Wheeler, 1989, 1990.
- Oil fields, north central Texas: Hager, 730.
- Oil possibilities, Diablo Plateau: Beede, 110.
- Oil-bearing formations: Udden, 1884.
- Palangana salt dome, Duval County: Barton, 85.

Texas—Continued.

Economic geology—Continued.

- Petroleum : Snider, 1736.
 central Texas : Matteson, 1231.
 Coke County : Beede, 108.
 Eastland and Stephens counties : Adams, 1.
 relation to carbon values in north Texas : Fuller, 628.
 Quicksilver deposits, anticlinal theory : Udden, 1879, 1883.
 Road-building materials : Nash, 1364.
 Salt deposits : Phalen, 1469.
 Salt dome structure : Lucas, 1141.
 Salt domes : Wolf, 2072.
 Seismographic method for underground observations : Udden, 1886.

Historical geology.

- Amarillo region : Gould, 678.
 Balcones fault region : Udden, 1885.
 Bend formation : Girty, 659.
 Bend series, age : Girty, 660.
 Brown County : Waite, 1924.
 central Texas : Moore, 1344.
 Bexar County oil fields : Sellards, 1650.
 Butler salt dome, Freestone County : Powers, 1484.
 Central Texas oil fields : Matteson, 1231.
 Coke County : Beede, 108, 109.
 Diablo Plateau : Beede, 110.
 Eastern Texas : Dumble, 524.
 Eastland and Stephens counties : Adams, 1.
 Ellenburger formation, north central Texas : Sellards, 1652, 1654.
 Fredericksburg and Washita formations, northern Texas : Adkins, 7.
 Géneral : Snider, 1736; Udden, 1880.
 Geologic map : Currier & Company, 429.
 Hudspeth County, Carboniferous formations, correlation : Beede, 111.
 Marathon fold, northwest Texas : Liddle, 1101.
 North central Texas : Hager, 730; Udden, 1887.
 Northern Texas petroleum fields : Pratt, 1489.
 Oil-bearing formations : Udden, 1884.
 Palangana salt dome, Duval County : Barton, 85.
 Pennsylvanian formations, north-central Texas : Plummer, 1475.
 Permo-Carboniferous, Glass Mountains : Böse, 161.
 Ranger oil field : Eckes, 536.
 Weno and Pawpaw formations : Adkins, 6.
 West Point salt dome, Freestone County : DeGolyer, 485.

Paleontology.

- Arctotherium : Matthew, 1243.
 Bend series, central Texas : Moore, 1344.
 Desmatosuchus, Triassic : Case, 303.
 Dimetrodon gigas : Gilmore, 655.
 Eocene flora, trans-Pecos Texas : Berry, 136.
 Exogyra, Cretaceous : Böse, 162.
 Fredericksburg and Washita formations, northern Texas : Adkins, 7.
 Labyrinthodont thoracic shield : Case, 302.
 Lutetia : Harris, 757.
 Pectinidae, Cretaceous : Kniker, 1021.
 Permo-Carboniferous ammonoids, Glass Mountains, Texas : Böse, 161.
 Pleistocene Vertebrata : Hay, 768.
 Phytosaurus, Triassic : Case, 303.
 Tarrant County : Winton, 2062.
 Turritella, Buda, and Georgetown limestones : Ellisor, 546.
 Weno and Pawpaw formations : Adkins, 6.

Petrology.

- Bend and Ellenburger limestones, microscopic characters : Udden, 1881.

Physical geology.

- Balcones fault zone : Sellards, 1651.
 Central Texas : Matteson, 1231.
 Coke County, geologic structure : Beede, 109.
 Eastland and Stephens counties, structure : Adams, 1.

Texas—Continued.

Physical geology—Continued.

Marathon fold, northwest Texas: Liddle, 1101.

North central Texas: Hager, 730.

Physiographic geology.

Butler salt dome, Freestone County: Powers, 1484.

Palangana salt dome, Duval County: Barton, 85.

Underground water.

Bend series, water problems: Fuller, 626.

Bexar County: Sellards, 1653.

Textbooks.

Chemical analysis of rocks: Washington, 1956.

Geology: Emerson, 550; Grabau, 689; Pirsson, 1474; Price, 1491.

Mineral deposits: Lindgren, 1104.

Mineralogy: Kraus, 1035.

Oil field geology: Hager, 729.

Physiography: Salisbury, 1593.

Thorium: Schaller, 1611.

Tin: Hill, 827; Knopf, 1024.

Alaska, Hot Springs district: Chapin, 333.

Lost River district: Fearing, 577.

Ruby district: Chapin, 334.

Seward Peninsula: Harrington, 753.

Idaho: Livingston, 1110.

Manitoba, West Hawk Lake region: DeLury, 490.

Virginia, Rockbridge County, Irish Creek: Haney, 739.

Tintic mining district, Utah: Lindgren, 1105.

Titanium: Hess, 800, 805, 806.

Tortugas.

Physical geology.

Covina, Loggerhead Key, origin: Field, 591.

Triassic. *See also* Paleontology, Triassic.

Alaska, Chulitna region, upper: Capps, 294.

northern, Canning River region: Leffingwell, 1074.

Arctic regions, Ellesmere Land: Høltedahl, 850.

Arizona, northwestern: Shimer, 1693.

Colorado, Montezuma County, McElmo anticline: Coffin, 375.

Connecticut, Meriden area: Waring, 1951.

Greenland: Böggild, 157.

Idaho, Fort Hall Indian Reservation: Mansfield, 1211.

southeastern: Mansfield, 1214.

Mesozoic of North and South America: Knowlton, 1026.

Newark system: Dorsey, 510.

New Mexico: Keyes, 993; Lee, 1068.

eastern: Baker, 55.

northeastern: Garrett, 640.

Puertecito district: Wells, 1978.

North America, southern: Stanton, 1754.

Oregon: Smith, 1728.

Pennsylvania, Gettysburg area: Stose, 1787.

Texas: Udden, 1880.

Amarillo region: Gould, 678.

Crockett County: Liddle, 1102.

Utah: Butler, 255.

Wyoming, Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

Trilobita.

Appendages: Calman, 274; anatomy, and relationships: Raymond, 1520.

General: Raymond, 1517.

Lichadidae, Ordovician: Foerste, 602.

Ordovician: Raymond, 1518; and Silurian: Foerste, 600.

Phylogeny: Raymond, 1519.

Pygidium: Raymond, 1514.

Trinidad.

Economic geology.

Petroleum: Macready, 1195.

Trinidad—Continued.

Historical geology.

General: Macready, 1195.

Paleontology.

Didymotis trinidadensis, Lower Cretaceous: Sommermeier, 1738.

Mollusca: Van Winkle, 1905.

Triceratops: Gilmore, 653.

Tungsten: Hess, 800, 801, 805; Shannon, 1674.

Alaska, Fairbanks district: Chapin, 331.

Enrichment of ores: Gannett, 636.

Idaho: Livingston, 1110.

Manitoba, southeastern: Bruce, 209.

New Brunswick, Burnt Hill Brook area: Young, 2097.

Yukon, Mayo area: Cockfield, 370.

Turonian ammonite fauna, Mexico: Böse, 164.

Twin Lakes district, Colorado: Howell, 874.

Turtles. *See* Reptilia.

Unconformities.

Massachusetts, Adams, Berkshire schist-Stockbridge limestone: Dale, 449.

Oklahoma: Bloesch, 155.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Underground water (general). *For regional see names of States. See also Mineral water; Springs.*

Association with petroleum and natural gas: Mills, 1313.

Mid-Continent oil fields: Neal, 1366.

Oil field waters of Gulf coast: Rogers, 1771.

Quantitative estimation: Meinzer, 1260.

Ungulata. *See* Mammalia.

Upper Silurian. *See* Silurian.

Upton-Thornton oil field, Wyoming: Hancock, 735.

Uranium: Hess, 800, 805, 806; Keeney, 967; Penrose, 1460.

Wyoming, Lusk: Lind, 1103.

Utah.

Geology: Pack, 1414; Schneider, 1613.

Areas described.

Tintic district: Lindgren, 1105.

Economic geology.

Carnotite, Gateway district: Farnum, 573.

East Tintic district: Goodwin, 672.

Economic minerals: Lewis, 1099.

Farnham anticline, Carbon County: Clark, 344.

Gold, silver, copper, lead, and zinc: Heikes, 781, 787.

Gypsum: Stone, 1755.

Hydrocarbons: Bardwell, 68.

Jurassic, southeastern Utah: Forrester, 611.

Mineral industry of Utah: Lewis, 1099.

Mountain Lake contact-metamorphic deposit near Salt Lake City: Rogers, 1565.

Oil shales: Anderson, 16; Condit, 395.

Ophir district: Wichman, 2024.

Ore deposits: Bulter, 253, 255.

Wasatch region: Butler, 252.

Salt deposits: Phalen, 1439.

Historical geology.

Abajo Mountains: Thorpe, 1841.

Book Cliffs coal field: Forrester, 610.

Bozeman beds: Keyes, 998.

Farnham anticline, Carbon County: Clark, 344.

General: Butler, 255.

Jurassic: Dake, 443; southeastern Utah: Forrester, 611.

Ophir district: Wichman, 2024.

Pre-Moenkopi unconformity, Colorado Plateau: Dake, 444.

Tertiary gravels, northern Utah: Keyes, 990.

Mineralogy.

Anglesite, Tintic district: Shannon, 1676.

Economic minerals: Lewis, 1099.

General: Butler, 255.

Hydrocarbons: Bardwell, 68.

Utah—Continued.

Paleontology.

- Carboniferous and Triassic faunas: Girty, 661.
Eocene Mammalia, Uinta Basin: Peterson, 1467.

Petrology.

- General: Butler, 255.

Physical geology.

- Abajo Mountains, structural features: Thorpe, 1841.
Sevier Valley, formation: Young, 2100.
Thrust faulting, Wasatch region: Butler, 252.

Physiographic geology.

- Abajo Mountains: Thorpe, 1841.

Vanadium: Hess, 800, 805, 806; Keeney, 947; Shannon, 1674.

Vein quartz, microscopic study: Adams, 5.

Vermont.

- State geologist, report: Perkins, 1463.

Areas described.

- Northfield terranes: Richardson, 1545.
Rochester quadrangle: Foye, 620.
Roxbury terranes: Richardson, 1546.

Economic geology.

- Barre, granite: Perkins, 1466.
Limestone: Jacobs, 893.

Historical geology.

- Barre, Mill Stone hill: Perkins, 1466.
Brandon lignite, age: Berry, 133.
Cuttingsville, eruptive rocks: Eggleston, 538.
Green Mountains, western flank: Dale, 446.
Ordovician, central Vermont: Richardson, 1544.

Paleontology.

- Northfield terranes: Richardson, 1545.
Ordovician, central Vermont: Richardson, 1544.

Petrology.

- Eruptive rocks, Cuttingsville: Eggleston, 438.

Physiographic geology.

- General: Perkins, 1464, 1465.
Postglacial sea-level waters, eastern Vermont: Fairchild, 557.

Vertebrata (general). *See also* Amphibia; Aves; etc.

- California, Rancho La Brea: Wyman, 2092.

- General: Osborn, 1409.

- Jaw muscles, phylogeny: Adams, 3.

- Lachrymal bone, evolution: Gregory, 707.

- Marsh collection: Schuchert, 1633.

- Opisthotonos: Dean, 481; Moodie, 1336, 1339.

- Oregon, Pleistocene: McCornack, 1165.

- Outline charts in teaching vertebrate paleontology: Mehl, 1254.

- Pleistocene: Hay, 767, 768.

- Snake Creek fauna: Matthew, 1236.

- Teaching vertebrate paleontology by outline charts: Mehl, 1254.

- West Indies: Matthew, 1239.

Virgin Islands.

Historical geology.

- General: Vaughan, 1915.

Physical geology.

- Earthquakes: Reid, 1531; 1867-68: Reid, 1533.

Virginia.

- Survey report: Watson, 1960, 1967.

Areas described.

- Tazewell County: Harnsberger, 749.

Economic geology.

- Clays and shales west of Blue Ridge: Ries, 1555.

- Coal, Tazewell County: Harnsberger, 749.

- Glass-sand resources: Watson, 1963.

- Gypsum: Stone, 1785.

- Manganese: Stose, 1792.

- Blue Ridge, west foot: Stose, 1786.

- Appalachian Valley: Stose, 1789.

Virginia—Continued.

Economic geology—Continued.

Peat, Dismal Swamp: Osbon, 1399.

Tin, Irish Creek, Rockbridge County: Haney, 739.

Historical geology.

Blue Ridge, west foot: Stose, 1786.

Ordovician: Raymond, 1515.

Oriskany and Helderberg formations: Holden, 845.

Mineralogy.

Dufrenite, Midvale, Rockbridge County: Gordon, 677.

Manganese minerals, Blue Ridge, west foot: Stose, 1786.

Manganotantalite, Amelia: Lee, 1066.

Paleontology.

Eocene: Van Winkle, 1905.

Physical geology.

Earthquake, Blue Ridge region, September 5, 1919: Watson, 1963; Woolard, 2179.

Physiographic geology.

Blue Ridge, west foot: Stose, 1786.

Dismal Swamp: Osbon, 1399.

Volcanic ash: Smith, 1725.

Volcanic rocks. *See* Igneous and volcanic rocks.

Volcanic gases: Butler, 254.

Volcanism.

Explosions, nature of: Sosman, 1741.

Problems of volcanology: Washington, 1958.

Volcanoes.

Alaska, Katmai: Griggs, 712.

emanations and incrustations: Shipley, 1795.

eruption, character: Griggs, 711; 1912: Fenner, 579.

Valley of Ten Thousand Smokes: Shipley, 1694.

Makushin Volcano: Maddren, 1197.

Costa Rica, Irazu: Tristan, 1862.

Poas Volcano, eruptions: Tristan, 1861.

Hawaii: Hawaiian Volcano Observatory, 763; Jaggard, 896.

Halemaumau: Finch, 593; Jagger, 895.

Kilauea: Jaggard, 895.

activity: MacCaughy, 1163.

composition of gases: Shepherd, 1688.

lava tube: Powers, 1485.

volcano observatory: Cross, 425.

Mauna Loa, gases: Shepherd, 1689.

Mexico: Waitz, 1927.

Pedregal de San Angel: Wittich, 2065.

Nicaragua, Masaya and Momotombo: Sapper, 1598.

Salvador, San Salvador, eruption: Friedlaender, 623.

Wapsipinicon breccias, Iowa: Norton, 1381.

Washington.

Stevens County: Weaver, 1970.

Economic geology.

Chromite deposits: Diller, 500.

Coal fields, southwestern Washington: Culver, 428.

Copper, Chewelah district: Armstrong, 37.

General: Fischer, 596.

Gold, silver, copper, lead, and zinc: Gerry, 644, 646.

Magnesite: Phalen, 1470.

Chewelah, Stevens County: Dolman, 509; Handy, 738.

Mineral resources: Shedd, 1687.

Ore deposits, geologic features: Patty, 1455.

Road-building sands and gravels: Leighton, 1075.

Stevens County: Weaver, 1970.

Historical geology.

Eagle Creek formation: Chaney, 325.

Geologic history: Weaver, 1969.

Paleontology.

Eagle Creek flora: Chaney, 325, 326.

Echinoidea: Kew, 981.

Washington—Continued.

Physiographic geology.

Juan de Fuca lobe of Cordilleran ice sheet: Bretz, 193.

Pleistocene submergence, Columbia Valley: Bretz, 192.

Weathering.

Barbados soils: Harrison, 809.

Desert weathering: Hobbs, 834.

Wekusko Lake area, Manitoba: Alcock, 12.

Well cuttings, examination: Trager, 1858.

Well records. *See* Borings.

Weno formation, Texas Comanchean: Adkins, 6.

West Indies (general). *See also* *names of islands.*

Geology: Vaughan, 1908, 1913.

Historical geology.

Cenozoic history: Vaughan, 1907.

Mesozoic history: Stanton, 1754.

Paleontology.

Bryozoa: Canu, 289.

Foraminifera: Cushman, 432.

Mammalia, affinities and origin: Matthew, 1235.

Tertiary decapod Crustacea: Rathbun, 1412.

Vertebrate: Matthew, 1239.

Physical geology.

Coral reefs, formation: Vaughan, 1911.

Physiographic geology.

Bartlett trough: Taber, 1806.

West Shiningtree gold area, Ontario: Hopkins, 906.

West Virginia.

Areas described.

Fayette County: Hennen, 797.

Randolph County, Mingo district: Reger, 1528.

Webster County: Reger, 1528.

Economic geology.

Coal, Abram Creek-Stony River field: Ashley, 40.

Coal, Fayette County: Hennen, 797.

Coals, sulphur in: White, 2008.

Natural gas: Reger, 1529.

Petroleum: Reger, 1529.

Salt deposits: Phalen, 1469.

Historical geology.

Boring, I. H. Lake No. 1: White, 2006.

Paleontology.

Pocono Brachiopoda, Tucker County: Price, 1493.

Webster County: Price, 1492.

Physical geology.

Slides in Conemaugh formation near Morgantown: Scheffel, 1612.

Physiographic geology.

Morgantown area: Scheffel, 1612.

Whitleyite: Merrill, 1275.

Wind gaps, northern Appalachians: Barrell, 74.

Windrow formation, upper Mississippi Valley: Thwaites, 1843.

Wind work.

Dust fall, March 9, 1918: Winchell, 2057.

Wisconsin.

Report of survey: Hotchkiss, 866.

Soils, Door County: Whitson, 2022.

Milwaukee County: Whitson, 2023.

north central Wisconsin: Whitson, 2021.

Economic geology.

Iron, Gogebic Range: Hotchkiss, 865, 867.

Lake Superior region: Winchell, 2058.

Zinc: Boericke, 160.

Historical geology.

Gogebic Range: Hotchkiss, 865, 867.

Paleozoic: Ulrich, 1891.

Tomah-Sparta quadrangles: Twenhofel, 1870.

Wisconsin—Continued.

Paleontology.

Cystids and blastoids, Racine: Foerste, 604.

Wood, replacement by dolomite: Adams, 4.

World view of mineral wealth: Umpleby, 1892.

Wyoming.

Economic geology.

Chromite deposits: Diller, 500.

Gold, silver, copper, and lead: Henderson, 788, 791.

Gypsum: Stone, 1785.

Lance Creek oil and gas field, Niobrara County, Wyoming: Hancock, 737.

Mule Creek oil field: Hancock, 736.

Oil possibilities, Baxter Basin, Sweetwater County: Schultz, 1639.

Oil shale: Condit, 395; southwestern Wyoming: Schramm, 1622.

Petroleum: Wegemann, 1971.

Maverick Springs: Collier, 389.

Thermopolis district: Collier, 387.

Upton-Thornton field: Hancock, 735.

Salt deposits: Phalen, 1469.

Upton-Thornton oil field: Hancock, 735.

Uranium ore, Lusk: Lind, 1103.

Historical geology.

Big Sand Draw anticline, Fremont County: Collier, 388.

Correlation table: Morgan, 1352.

Geologic map: Morgan, 1352.

Green River formation, southwestern Wyoming: Schramm, 1622.

Lance Creek field, Niobrara County: Hancock, 737.

Maverick Springs, Fremont County: Collier, 389.

Mule Creek oil field: Hancock, 736.

Rock Springs area, Sweetwater County: Schultz, 1639.

Thermopolis district: Collier, 387.

Upton-Thornton oil field: Hancock, 735.

Mineralogy.

Chlorite, chromiferous: Shannon, 1675.

Paleontology.

Amphibian (Ototriton), Lysite beds, Bridger Creek: Loomis, 1122.

Cardioceratidae: Reeside, 1525.

Eocene insects: Cockerell, 369.

Notharctus, Eocene primate: Gregory, 706.

Physical geology.

Heart Mountain overthrust, Cody region: Hewett, 811.

Physiographic geology.

Beartooth Plateau, glacial features: Dake, 442.

Yellow Pine cinnabar district, Idaho: Larsen, 1059.

Yukon.

Mayo area: Cockfield, 370, 373.

Ogilvie Range: Cockfield, 372.

Economic geology.

Mayo silver area: Johnson, 933.

Twelvemile area; silver-lead deposits: Cockfield, 371.

Mineralogy.

Epidote, White Horse Rapids: Poittevin, 1478.

Physical geology.

Klutlan Glacier: Lambart, 1048.

Zinc: Siebenthal, 1698, 1700.

Arizona: Heikes, 784, 786.

British Columbia, Ainsworth district: Schofield, 1619.

California: Yale, 2093, 2095.

Central States: Dunlop, 527.

Colorado: Henderson, 790, 793.

Eastern States: Dunlop, 529; Hill, 822.

Idaho: Gerry, 644, 646.

Pine Creek district: Jones, 944.

Montana: Gerry, 645; Heikes, 784.

Nevada: Heikes, 782, 785.

New Mexico: Henderson, 789, 792.

Zinc—Continued.

- Quebec, Gaspesia : Beidelman, 112.
Gaspé Peninsula : Mailhot, 1203.
Smithsonite, formation : Watson, 1966.
Texas : Henderson, 789, 792.
Utah : Butler, 255 ; Heikes, 781, 787.
Tintic district : Lindgren, 1105.
Washington : Gerry, 644, 646.
Wisconsin district : Boericke, 160.
Zircon : Schaller, 1611.
Occurrence : Meyer, 1290.

98761—22—16

LISTS.

(The numbers refer to entries in the bibliography.)

CHEMICAL ANALYSES.¹

Aegirite, 538.
 Albanite, 1957.
 Alum, 631.
 Alunite, 631.
 Amesite, 1667, 1675.
 Andesite, 255, 1105.
 Andose, 538.
 Anorthosite, 1303.
 Aplite, 402.
 Apthitalite, 616.
 Artesian water, 267.
 Augite andesite, 1454.
 Augite latite, 1105.
 Augite porphyrite, 255.
 Barkevikite, 538.
 Barite, 1937.
 Barytes ore, 880.
 Basalt, 246, 1015.
 Bindehlmitite, 1668.
 Bismutoplagionite, 1669, 1678.
 Black sands, 1115.
 Boulangerite, 1678.
 Brannerite, 804.
 Braunite, 1317.
 Brine, 631, 1313, 1537.
 Bronzite, 1200.
 Brugnateite, 613.
 Bucholzite, 1676.
 Cacoclasite, 176.
 Cecillite, 1957.
 Chalcantinite, 1060.
 Chalcodite, 1672.
 Chlorite, chromiferous, 1675.
 Chrome ore, 239.
 Chromite, 235.
 Clay, 267, 714, 1119, 1555, 1711, 1794.
 Clay, red, 768.
 Coal, 40, 267, 335, 428, 749, 1116, 1216, 1217, 1528, 1576, 1794, 1796.
 Corundophilite, 1675.
 Cryolite, 1547.
 Dacite, 1507.
 Dahllite, 158.
 Diabantite, 1672.
 Diabase, 1507.
 Diatomaceous earth, 1538.
 Diorite, 1507.
 Dolomite, 1381, 1423, 1717.
 Echellite, 177.
 Enstatite, 1275, 1276.
 Epidote, 1677.

Essexite, 538.
 Feldspar, 86, 104.
 Feldspar porphyry, 246.
 Ferrierite, 692.
 Flagstaffite, 722.
 Foyaitite, 538.
 Gabbro, 86.
 Gedrite, 1676.
 Glass sand, 1547, 1962.
 Glaucosite, 1215.
 Goethite, 1482.
 Goslarite, 1060.
 Granite, 211, 1507, 1619.
 Granite gneiss, 211.
 Granodiorite, 86, 255, 1507.
 Graphite ore, 2053.
 Greensand, 1215.
 Gumbotil, 963.
 Hausmannite, 1317, 1320.
 Hematite, 1481.
 Hematite ore, 1985.
 Higginsite, 1423.
 Hornblende, 538.
 Hornblende porphyrite, 255.
 hornblendite, 402, 1753.
 Hydromagnesite, 1537, 1538.
 Hydromica, 104.
 Hydrotalcite, 613.
 Iron ore, 774.
 Italite, 1957.
 Jamesonite, silver-bearing, 1678.
 Kaolin, 104, 1119, 2051.
 Lamprophyre, 246.
 Laurvikite, 538.
 Lava, 255.
 Lead ore, 1105.
 Leifite, 159.
 Lepidocrocite, 1482.
 Lepidolite, 1547.
 Leucitite, 1957.
 Limestone, 255, 267, 590, 749, 880, 1381, 1507, 1794, 1846.
 Limonite, 1482.
 Limonite ore, 589.
 Magnesite, 509.
 Magnetite ore, 716.
 Manganese ore, 237, 746, 771, 1320, 1355, 1786.
 Margarite, 1677.
 Margarodite, 1677.
 Melanterite, 1060.

¹ The analyses given in Schoch, 1614, are not included in this list.

Metadacite, 86.
 Meteorites, 1268, 1271, 1275, 1276.
 Miaskose, 538.
 Mine water, 1507.
 Mineral waters, 643.
 Missourite, 1957.
 Monzonite, 255, 1105, 1454.
 Monzonite porphyry, 255.
 Natural gas, 1566.
 Naumannite, 1679.
 Nickel ore, 1412.
 Nordmarkite, 538.
 Norite—micropegmatite, 1018.
 Oil, 1566.
 Oil-field waters, 1566, 1571.
 Olivine gabbro, 402.
 Orendite, 1957.
 Orthoclase, 1547.
 Paraffin dirt, 1681.
 Paragneiss, 10.
 Parahopeite, 1936.
 Peat, 1399.
 Peckhamite, 1276.
 Pelhamite, 1662.
 Peridotite, 589, 1200.
 Petroleum, 735, 1566.
 Platinum ore, 752.
 Plazolite, 619.
 Porphyry, 255.
 Prehnite, 1705.
 Prochlorite, 1677.
 Pyaskite, 255, 538.
 Pyrite ore, 390.
 Pyroaurite, 613.
 Quartz-biotite latite, 1454.
 Quartz diorite, 255.
 Quartz diorite porphyry, 1507.
 Quartz monzonite, 255, 1507.
 Quartz porphyry, 1105.
 Quartzite, 880.

Andesite, 255.
 Andose, 538.
 Anorthosite, 1303, 1304.
 Augite porphyrite, 255.
 Bindeimite, 1668.
 Diabase, 1303, 1304.
 Gabbro, 86, 1303, 1304.
 Gabbro-diorite, 1303.
 Gneiss, 1303, 1304.
 Granite, 1304, 1507.
 Granitic syenite, 1304.
 Granodiorite, 86.
 Hornblende porphyrite, 255.
 Hydromica, 104.
 Ilalite, 1957.
 Laurvikose, 538.

Achteragadite, 614.
 Albite, 692, 1477.
 Allanite, 1905.
 Alunite, 254, 1507.
 Amesite, 1667, 1675.

Quartzite, feldspathic, 226.
 Rhyolite, 226, 255, 1016, 1105, 1507.
 Rhyolite porphyry, 226.
 Salt, 1469.
 Salt peter, 632.
 Sand, 441.
 Sandstone, 226, 441, 1547.
 Sarcopside, 843.
 Scapolite, 1677.
 Schist, 1507.
 Serpentine, 86, 1015.
 Serpentine rock, 589.
 Shale, 325, 1119.
 Siderite, 390.
 Slate, feldspathic, 226.
 Sodalite-nephelite syenite, 538.
 Sodium salts, 1537.
 Spencerite, 1936.
 Stichtite, 613.
 Stilpnomelane, 1631, 1676.
 Syenite, 246.
 Syenite porphyry, 255.
 Talc, 504.
 Tavolaitite, 1957.
 Tetrahedrite, 1676.
 Thaumassite, 617.
 Tinguaita, 538.
 Toscanose, 1105.
 Trachyte, 255.
 Triplite, 1676.
 Turgite, 1481.
 Umptekite, 538.
 Venanzite, 1957.
 Vesbite, 1957.
 Vicoite, 1957.
 Volcanic gases, 254, 1688, 1689.
 Vonsenite, 532.
 Water, 30, 462, 643, 745, 1215, 1313, 1507,
 1566, 1846, 1951, 1979.
 Xanthosiderite, 1482.

MINERAL ANALYSES.

Lava, 255.
 Metadacite, 86.
 Meteorite, Cumberland Falls, Ky., 1275.
 Miaskose, 538.
 Monzonite, 1507.
 Nordmarkose, 538.
 Porphyry, 255.
 Quartz monzonite, 874, 1507.
 Rhyolite, 255.
 Rhyolite schist, 1507.
 Serpentine rock, 589.
 Syenite, 1304.
 Syenite-granite, 1303.
 Talc, 504.
 Tehamose, 1507.
 Trachyte, 255.

MINERALS DESCRIBED.

Analcite, 1908.
 Anglesite, 1661, 1676.
 Anhydrite, 254.
 Anorthite, 1453.
 Anthophyllite, 181, 1676.

- Apophyllite, 1208.
 Apathitalite, 616.
 Arsenolite, 614.
 Axinite, 1479.
 Backströmite, 609.
 Barite, 254, 1563, 1937, 2012, 2050.
 Beryl, 597.
 Bindheimite, 1668.
 Biotite, 1507.
 Bismutoplagonite, 1669, 1678.
 Boulangerite, 1678.
 Boussingaultite, 1058.
 Brannerite, 804.
 Braunitz, 1317, 1320.
 Brugnattellite, 613.
 Bucholzite, 1676.
 Cacoclasite, 176.
 Calamine, 1478, 1936.
 Calcite, 1208, 1676, 1973.
 Cerusite, 1480, 1936.
 Chalcedony, 5.
 Chalcocite, 1507.
 Chalcodite, 1672.
 Chalcopyrite, 1952, 1208, 1507, 1993.
 Chancanthite, 1060.
 Chesterite, 1182.
 Chlorite, chromiferous, 1675.
 Chrysocolla, 1507.
 Chubutite, 608.
 Cinnabar, 614.
 Cobalt minerals, 522.
 Cocinerite, 609, 868.
 Columbite, 1723, 1934.
 Copper, 1507.
 Corundophilite, 1675.
 Creedite, 254.
 Cummingtonite, 1676.
 Cuprite, 1507.
 Dahllite, 158.
 Danburite, 614.
 Datolite, 1635, 1208, 1660, 1676.
 Diabantite, 1208, 1672.
 Dufrenite, 677.
 Echellite, 177, 609.
 Elaterite, 1016.
 Epidesmene, 676.
 Epidote, 1478, 1677.
 Epsomite, 1935.
 Ferrazite, 609.
 Ferrierite, 608, 692.
 Flagstaffite, 722.
 Fluorite, 696, 1677, 1938.
 Fluorspar, 1973.
 Friedelite, 614.
 Gageite, 614.
 Galena, 1973.
 Ganophyllite, 1563.
 Gavite, 609.
 Gedrite, 1676.
 Glauconite, 664.
 Gmelinite, 1208.
 Goethite, 1482, 1746.
 Goslarite, 1060.
 Gypsum, 254.
 Hausmannite, 1317, 1320, 1563.
 Hauynite, 254.
 Hematite, 618, 1286, 1746.
 Hibbenite, 1936.
 Higginsite, 1423, 1425.
 Hinsdalite, 254.
 Hogbömite, 608.
 Hopeite, 1936.
 Hydrotalcite, 613.
 Indianaite, 1118.
 Jamesonite, silver-bearing, 1678.
 Laumontite, 1208.
 Leadhillite, 1664.
 Leifite, 159, 608.
 Lepidocrocite, 1482.
 Leucophoenicite, 614.
 Limonite, 1482, 1746, 1786.
 Linarite, 1664.
 Lithiophyllite, 621.
 Malachite, 1507.
 Manganfayalite, 609.
 Manganite, 1320, 1786.
 Manganotantalite, 1066.
 Margarite, 1677.
 Margarodite, 1677.
 Melanterite, 1060.
 Molybdenite, 1507, 1563.
 Monazite, 1426, 1994.
 Muscovite, 1507.
 Natrolite, 1208.
 Naumannite, 1679.
 Noselite, 254.
 Olivétraite, 608.
 Orvillite, 608.
 Ornetite, 609.
 Ozokerite, 68.
 Parahopeite, 1936.
 Pectolite, 1208.
 Pelhamite, 1662.
 Phenacite, 692.
 Pitchblende, 862.
 Plancheite, 1608.
 Plazolite, 619.
 Polycrase, 1477.
 Prehnite, 1705.
 Prochlorite, 1677.
 Psilomelane, 1320, 1563, 1786.
 Pyrite, 1466, 1955, 1208, 1507, 1996, 2013, 2014.
 Pyroaurite, 613.
 Pyrobelonite, 609.
 Pyrochroite, 1563.
 Pyrolusite, 1320, 1786.
 Quartz, 5, 1208, 1507.
 Racewinitz, 608.
 Rhodochrosite, 1563.
 Rhodonite, 621.
 Rock asphalt, 68.
 Rutile, 1286.
 Saponite, 692.
 Sarcopside, 852.
 Scapolite, 1477, 1677.
 Scheelite, 614.
 Serpentine, 589.
 Shattuckite, 1608.
 Sobralite, 609.
 Spencerite, 1936.
 Sphalerite, 1208, 1507, 1973.
 Spurrite, 617.
 Stephanite, 1478.

Stichtite, 613.
 Stilbite, 1208.
 Stilpnomelane, 1672, 1676.
 Sulphohalite, 615.
 Tabbite, 68.
 Tephroite, 1563.
 Tetrahedrite, 1676.
 Thaumassite, 254, 617, 692.
 Titanite, 1477.
 Topaz, 1677.
 Torbenite, 175.

Triplite, 1676.
 Turgite, 1482.
 Turite, 1746.
 Villamanite, 609.
 Vonsenite, 532.
 Wad, 1320, 1786.
 Wiluite, 614.
 Wulfenite, 612.
 Wurtzellite, 68.
 Zebedassite, 608.
 Zincite, 614.

ROCKS DESCRIBED.

Alaskite, 166.
 Andesite, 761, 1105, 1655.
 Andesite porphyry, 1542.
 Andesite tuff, 1507.
 Anorthosite, 402.
 Argillite, 1619.
 Augite andesite, 1454.
 Augite gabbro, 402.
 Augite latite, 1105.
 Basalt, 246, 1454, 1486.
 Biotite granite, 1030.
 Bronzite, 1200.
 Camptonite, 1619.
 Dacite, 1507, 1655.
 Diabase, 1507.
 Diorite, 10, 166, 752, 874, 1454, 1655.
 Dunite, 1030.
 Enstatite, 1030.
 Epidosite, 1030.
 Essexite, 538.
 Feldspar porphyry, 246.
 Gabbro, 86, 402.
 Gabbro-diorite, 1030.
 Gneiss, 538, 874.
 Granite, 10, 166, 402, 1030, 1507, 1619, 1655.
 Granite porphyry, 1199.
 Granodiorite, 86, 1507, 1655.
 Granophyre, 1030.
 Harzburgite, 1030.
 Hornblende, 1030, 1753.
 Italite, 1957.
 Kersantite, 1673.
 Lamprophyre, 246, 1673.
 Latite, 1454, 1655.
 Lava, 1655.
 Leucite, 1957.

Limestone, 538, 1619.
 Marble, 874.
 Metadacite, 86.
 Metagabbro, 86.
 Minette, 1673.
 Monzonite, 1105, 1655.
 Monzonite porphyry, 1454.
 Nephelite basalt, 1486.
 Nordmarkite, 538.
 Odinite, 1673.
 Olivine gabbro, 86, 402.
 Paragneiss, 10.
 Pegmatite, 874.
 Peridotite, 1030, 1200.
 Pulaskite, 538.
 Pyroxene gabbro, 86.
 Pyroxenite, 1030.
 Quartz diorite, 86, 1507.
 Quartz latite, 1655.
 Quartz monzonite, 752, 874, 1030, 1655.
 Quartz monzonite porphyry, 1507.
 Quartz porphyry, 1105, 1501.
 Quartzite, 874.
 Rhyolite, 10, 752, 874, 1105, 1454, 1655.
 Schist, 874, 1542.
 Silxite, 1306.
 Sodalite-nephelite syenite, 538.
 Soda rhyolite, 752.
 Spessartite, 1673.
 Syenite, 246, 1199, 1655.
 Syenite porphyry, 1199.
 Toscanose, 1105.
 Trachyte, 1486, 1655.
 Vesbite, 1957.
 Vitrophyre, 1655.
 Vogesite, 1673.
 Websterite, 1030.

GEOLOGIC FORMATIONS DESCRIBED.

Aberdeen formation, British Columbia:
 Schofield, 1620.
 Abilene conglomerate, Permian, Kansas:
 Snider, 1736.
 Abitibi group, pre-Cambrian, Quebec: Mail-
 hoit, 1202; Tanton, 1813.
 Abitibi volcanics, pre-Cambrian, Quebec:
 Cooke, 401.
 Abitibi River limestone, Devonian, Canada:
 Savage and Van Tuyl, 1603.
 Abo beds, Pennsylvanian, New Mexico:
 Böse, 163.

Abo formation, Carboniferous, New Mexico:
 Baker, 55.
 Abo sandstone, Pennsylvanian, New Mex-
 ico: Semmes, 1659.
 Abo sandstone, Permian, New Mexico:
 Wells, 1978.
 Abrigo limestone, Cambrian, Arizona:
 Mitchell, 1322.
 Acila shales, Oligocene, Oregon: Harrison
 and Eaton, 761.
 Ackerman clays, Tertiary, Mississippi:
 Lowe, 1138.

- Addy quartzite, Paleozoic, Washington: Weaver, 1970.
- Admire shale, Pennsylvanian, Kansas: Snider, 1736.
- Admire shale member, Pennsylvanian, Kansas: Moore, 1346.
- Aftonian interglacial stage, Pleistocene: Baker, 56.
- Aftonian interglacial stage, Pleistocene, Iowa: Arey, 35; Tilton, 1846.
- Aftonian stage, Pleistocene, Iowa: Arey, 36; Tilton 1847.
- Agua Buenas limestones, Cretaceous (?), Porto Rico: Semmes, 1655.
- Ainsworth formation, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Ainsworth formation, Paleozoic, British Columbia: Schofield, 1619.
- Ainsworth series, Paleozoic, British Columbia: Bancroft, 66; Schofield, 1619.
- Ajax limestone, Ordovician, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- Akron (dolomite) formation, Silurian, New York and Ontario: Williams, 2034.
- Alachua clays, Quaternary, Florida: Hay, 767.
- Alachua formation, Tertiary, Florida: Sellards, 1648.
- Alamito terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Albany formation, Permian, Texas: Matteson, 1231.
- Albright limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Albuquerque series, Proterozoic, New Mexico: Keyes, 993.
- Alger formation, Silurian, Kentucky: Miller, 1293.
- Algoman, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
- Algoman series, pre-Cambrian, New York: Alling, 28.
- Alibates dolomite, Permian, Texas: Gould, 678.
- Allegheny formation, Pennsylvanian, Maryland: Swartz, 1804.
- Allegheny formation, Pennsylvanian, Ohio: Stout, 1794.
- Allegheny series, Pennsylvanian, Kentucky: Miller, 1293.
- Allegheny series, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Allensville, Mississippian, Ohio: Miller, 1293.
- Allison formation, Cretaceous, Alberta: Rose, 1576.
- Allison formation, Jurassic, Alberta: Rose, 1575.
- Alsen cherty limestones, Devonian, New York: Grabau, 685.
- Altamaha (Lafayette?) formation, Tertiary, Georgia: McCallie, 1159.
- Altamont limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Altamont limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Alto formation, Devonian, Illinois: Savage, 1604, 1605.
- Alum Bluff formation, Miocene, Florida: Sellards, 1647, 1648.
- Alum Bluff formation, Miocene, Gulf States: Vaughan, 1910.
- Americus limestone, Pennsylvanian, Kansas: Snider, 1736.
- Americus limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Ames limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Ames limestone, Pennsylvanian, Ohio: Stout, 1794.
- Amisk series, pre-Cambrian, Manitoba: Bruce, 208.
- Amisk volcanics, pre-Cambrian, Manitoba: Hanson, 744.
- Amsden formation, Carboniferous, Wyoming: Collier, 389.
- Anacacho limestone, Cretaceous, Texas: Udden, 1880.
- Andrews schist, Cambrian, Georgia: McCallie, 1159.
- Angola shale, Devonian, New York: Husakof and Bryant, 884.
- Anian period, Proterozoic, New Mexico: Keyes, 993.
- Animikean, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
- Antietam sandstone, Cambrian, Maryland: Bassler, 90.
- Antonio terrane, Proterozoic, New Mexico: Keyes, 993.
- Antonito terrane, Permian, New Mexico: Keyes, 993.
- Anvil member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Apishapa shale, Cretaceous, New Mexico: Garrett, 640.
- Apishapa terrane, Cretaceous, New Mexico: Keyes, 993.
- Apison shale, Cambrian, Georgia: McCallie, 1159.
- Aquidneck shales, Carboniferous, Rhode Island: Perkins, 1462.
- Arago formation, Eocene, Oregon: Smith and Packard, 1728.
- Arapahoe beds, Cretaceous, Colorado: Henderson, 795.
- Arapahoe period, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Arbuckle limestone, Cambrian and Ordovician, Oklahoma: Decker, 483.
- Archuleta terrane, Eocene, New Mexico: Keyes, 993.
- Arctomys formation, Cambrian, Alberta: Walcott, 1928.
- Arecibo formation, Oligocene, Porto Rico: Hodge, 837.

- Arecibo formation, Tertiary, Porto Rico: Berkey, 124; Hubbard, 877; Maury, 1248; Semmes, 1655.
- Arikaree formation, Miocene, South Dakota: O'Harra, 1389.
- Arkadelphia clay, Cretaceous, Arkansas: Miser, 1319.
- Arkansas novaculite, Devonian, Arkansas: Miser, 1319.
- Armendaris terrane, Ordovician, New Mexico: Keyes, 993.
- Armuchee chert, Devonian, Georgia: McCallie, 1159.
- Arnheim, Ordovician, Kentucky: Miller, 1293.
- Arnheim limestone, Ordovician, Tennessee: Butts, 258.
- Arriban series, Miocene, New Mexico: Keyes, 993.
- Ashokan formation, Devonian, New York: Grabau, 685.
- Aspen shale, Cretaceous, Wyoming: Schultz, 1639.
- Astoria shales, Oligocene, Oregon: Harrison and Eaton, 761.
- Athabaska series, pre-Cambrian (?), Canada: Alcock, 14.
- Atchison group, Carboniferous, Iowa: Smith, 1714.
- Atoka formation, Pennsylvanian, Arkansas: Miser, 1319.
- Atoka formation, Pennsylvanian, Oklahoma: Bloesch, 155; Snider, 1736.
- Attawapiskat coral reef, Silurian, Canada: Savage and Van Tuyl, 1603.
- Attleboro sandstones, Carboniferous, Rhode Island: Perkins, 1462.
- Austin chalk, Cretaceous, Texas: Dumble, 524; Snider, 1736; Udden, 1880.
- Austin chalk formation, Cretaceous, Texas: Shuler, 1696.
- Austin formation, Cretaceous, Texas: Sellards, 1650, 1653.
- Austin ("Annona") chalk, Cretaceous, Arkansas: Miser, 1319.
- Aux Vases sandstone, Mississippian, Illinois: Weller, 1974.
- Aux Vases sandstone, Mississippian, Missouri: Dake, 441.
- Avant limestone, Carboniferous, Oklahoma: Goldman, 666; Hopkins and Powers, 854.
- Avant limestone, Pennsylvanian, Oklahoma: Ross, 1578.
- Avondale volcanics, pre-Cambrian, Newfoundland: Buddington, 226.
- Aztecian series, Eocene, New Mexico: Keyes, 993.
- Backbone limestone, Devonian, Illinois: Savage, 1605.
- "Back-bone" limestone, Devonian, Illinois: Savage, 1604.
- Bad River cherty dolomite, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Bailey limestone, Devonian, Illinois: Savage, 1604, 1605.
- Bailey limestone, Devonian, Missouri: Dake, 441.
- Baitoa formation, Miocene, Dominican Republic: Cooke, 400.
- Baltimore gneiss, pre-Cambrian, Maryland, Pennsylvania, and Delaware: Bascom and Miller, 86.
- Bandera shale, Pennsylvanian, Kansas, and Oklahoma: Snider, 1736.
- Bandera shale member, Pennsylvanian, Kansas: Moore, 1346.
- Banff (Upper) formation, Triassic, Alberta: Rose, 1576.
- Bangor limestone, Carboniferous, Georgia: McCallie, 1159.
- Bar Harbor series, Mount Desert Island, Maine: Bascom, 87.
- Barnes conglomerate, Cambrian, Arizona: Ransome, 1507.
- Barranquitas-Cayey series, Comanchean, Porto Rico: Hodge, 837.
- Barstow formation, Tertiary, California: Merriam, 1264.
- Bartlesville sand, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346.
- Bartlett Island series, Mount Desert Island, Maine: Bascom, 87.
- "Barton Beds," Silurian, Ontario: Williams, 2034.
- Bashi formation, Tertiary, Alabama: Brantley, 191.
- Bas Obispo formation, Eocene (?), Canal Zone: MacDonald, 1170.
- Bass Island series, Silurian, Ontario: Williams, 2034.
- Batesville sandstone, Mississippian, Arkansas: Miser, 1319, 1320.
- Baxter shale, Cretaceous, Wyoming: Schultz, 1639.
- Beale diorite, Jurassic (?), British Columbia: Dolmage, 506.
- Bear Branch member, Devonian, Tennessee: Dunbar, 525.
- Bearpaw formation, Cretaceous, Alberta: Allan, 20; Slipper, 1712; Stewart, 1766.
- Bearpaw shale, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Bear Pond schist, pre-Cambrian, New York: Ailing, 28.
- Beaumont clays, Pleistocene, Texas: Dumble, 524.
- Beaumont formation, Quaternary, Texas: Hay, 767.
- Beauvais sandstone, Devonian, Missouri: Dake, 441.
- Beaver Bend limestone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Bechler conglomerate, Cretaceous (?), Idaho: Mansfield, 1216.
- Beckwith formation, Jurassic, Wyoming: Schultz, 1639.
- Becraft limestone, Devonian, New York: Jones, 951.
- Bedford clay, Pennsylvanian, Ohio: Stout, 1794.

- Bedford shale, Mississippian, Kentucky: Miller, 1293.
- Bedford shale, Mississippian, Ohio: Decker, 483.
- Beech Creek limestone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Beech Mountain paramphibolite, pre-Cambrian, New York: Alling, 28.
- Beechwood member, Devonian, Kentucky: Miller, 1293.
- Beekmantown limestone, Ordovician, Maryland: Bassler, 90.
- Beekmantown limestone, Ordovician, New York: Decker, 483.
- Beekmantown (Ogdensburg) dolomite, Ordovician, New York: Chadwick, 310.
- Bella terrane, Devonian, New Mexico: Keyes, 993.
- Bellaire sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Bellevue, Ordovician, Kentucky: Miller, 1293.
- Bell Mountain sandstone member, Cretaceous, New Mexico: Winchester, 2061.
- Belly River formation, Cretaceous, Alberta: Stewart, 1766.
- Belly River series, Cretaceous, Alberta: Slipper, 1712.
- Belt series, Algonkian, Idaho: Jones, 944.
- Bend formation, Carboniferous, Texas: Girty, 659.
- Bend formation, Pennsylvanian, Texas: Udden, 1880.
- Bend series, Carboniferous, Texas: Girty and Moore, 660; Udden, 1887.
- Bend series, Pennsylvanian, Texas: Matteson, 1231; Moore, 1344; Plummer, 1475.
- Bend (Lower) shale, Carboniferous, Texas: Udden, 1887.
- Bend (Lower) shale, Mississippian, Texas: Girty, 659; Matteson, 1231.
- Bend (Lower) shale, Pennsylvanian, Texas: Moore, 1344; Plummer, 1475.
- Bennett formation, pre-Cambrian, Quebec: Knox, 1030.
- Benson bed, Ordovician, Kentucky: Miller, 1293.
- Benton formation, Cretaceous, Alberta: Rose, 1576; Stewart, 1766.
- Benton formation, Cretaceous, Colorado: Henderson, 795.
- Benton formation, Cretaceous, Kansas: Moore, 1346; Snider, 1736.
- Benton shale, Cretaceous, North Dakota: Leonard, 1082.
- Benwood limestone, Pennsylvanian, Ohio: Stout, 1794.
- Bernalillan series, Permian, New Mexico: Keyes, 993.
- Berea grit, Carboniferous, Kentucky: Jillson, 918.
- Berea sandstone, Mississippian, Kentucky: Miller, 1293.
- Berenda terrane, Devonian, New Mexico: Keyes, 993.
- Berne conglomerate, Mississippian, Ohio: Miller, 1293.
- Bertie waterlime formation, Silurian, Ontario: Williams, 2034.
- Bertram beds, Devonian, Iowa: Norton, 1381.
- Berwick gneiss, Carboniferous (?), Maine and New Hampshire: Wandke, 1943.
- Bethany Falls limestone, Pennsylvanian, Kansas: Snider, 1736.
- Bethany Falls limestone (Earlham), Pennsylvanian, Iowa: Tilton, 1846.
- Bethany Falls limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Bethel sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Bethel, Mississippian, Kentucky: Miller, 1293.
- Big Basin sandstone, Permian, Kansas: Snider, 1736.
- Big Basin sandstone member, Permian, Kansas: Moore, 1346.
- Big Bend gravels, Pleistocene, Pennsylvania: Williams, 2032.
- Big Blue group, Permian, Kansas: Moore, 1346; Snider, 1736.
- Bigby substage, Ordovician, Kentucky: Miller, 1293.
- Bigby formation, Ordovician, Tennessee: Galloway, 633.
- Bigfork chert, Ordovician, Arkansas: Miser, 1319.
- Bigheart sandstone, Carboniferous, Oklahoma: Hopkins and Powers, 854.
- Bigheart sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Bighorn dolomite, Ordovician, Wyoming: Collier, 389.
- Big Spruce Knob sandstone, Mississippian: West Virginia: Reger, 1528.
- Big Spruce Knob shale, Mississippian, West Virginia: Reger, 1528.
- Bingen formation, Cretaceous, Arkansas: Miser, 1319.
- Birch Creek limestone, Carboniferous, Oklahoma: Hopkins and Powers, 854.
- Birch Creek schist, pre-Ordovician, Alaska: Capps, 291.
- Birch Lake sandstone, Cretaceous, Alberta: Slipper, 1712.
- Bird Creek limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172; Heald, 779; Heald and Mather, 780.
- Birdsong formation, Devonian, Tennessee: Dunbar, 525.
- Birmingham shale, Pennsylvanian, Ohio: Stout, 1794.
- Bisher member of the West Union formation, Silurian, Ohio: Foerste, 598, 599.
- Bishop conglomerate, Tertiary or Quaternary, Wyoming: Schultz, 1639.
- Biwabik formation, pre-Cambrian, Minnesota: Broderick, 197, 198; Grout and Broderick, 716.
- Blackhand conglomerate, Mississippian, Kentucky: Miller, 1293.

- Black River group, Ordovician, Tennessee: Galloway, 633.
- Black River limestone, Ordovician, New York: Clark, 345.
- Blacksmith formation, Cambrian, Idaho: Mansfield, 1211.
- Blair formation, Cretaceous, Wyoming: Schultz, 1639.
- Blairmore formation, Cretaceous, Alberta: Rose, 1575, 1576; Slipper, 1712; Stewart, 1766.
- Blakely sandstone, Ordovician, Arkansas: Miser, 1319.
- Blacklock sandstone, Silurian, Arkansas: Miser, 1319.
- Bloomfield limestone, Pennsylvanian, Ohio: Stout, 1794.
- Bloomington formation, Cambrian, Idaho: Mansfield, 1211.
- Bloyd shale, Pennsylvanian, Arkansas: Miser, 1319.
- Bluebell dolomite, Ordovician, Utah: Lindgren and Loughlin, 1105.
- Bluebird dolomite, Cambrian, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- Bluefield shale, Mississippian, Virginia: Harnsberger, 749.
- Bluestone formation, Mississippian, Virginia: Harnsberger, 749.
- Boggy formation, Pennsylvanian, Oklahoma: Bloesch, 155.
- Boggy shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Boggs member, Pennsylvanian, Ohio: Stout, 1794.
- Bohio conglomerate, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
- Bois d'Arc limestone, Devonian, Oklahoma: Decker, 483.
- Bolin Creek member, Cambrian, Missouri: Dake, 441.
- Bolivar fire clay, Pennsylvanian, West Virginia: Reger, 1528.
- Bonaventure conglomerate, Devonian, Quebec: Clarke, 356.
- Bone Valley, Pliocene, Florida: Sellards, 1647.
- Bone Valley formation, Tertiary, Florida: Sellards, 1648.
- Bonneterre formation, Cambrian, Missouri: Dake, 441.
- Boone chert, Mississippian, Arkansas: Miser, 1320.
- Boone formation, Carboniferous, Oklahoma: Berger, 123.
- Boone formation, Mississippian, Arkansas: Miser, 1319.
- Boone formation, Mississippian, Oklahoma: Berger, 123; Snider, 1736.
- Boundary argillite, Paleozoic, Washington: Weaver, 1970.
- Bowhan sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Bozeman beds, Tertiary, Rocky Mountain region: Keyes, 998.
- Brandon lignite, Tertiary, Vermont: Berry, 133.
- Brannon bed, Ordovician, Kentucky: Miller, 1293.
- Brandy Run sandstone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Brandywine formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Brassfield formation, Silurian, Ohio: Foerste, 598.
- Brassfield limestone, Silurian, Arkansas: Miser, 1319, 1320.
- Brassfield stage, Silurian, Kentucky: Miller, 1293.
- Brasstown schist, Cambrian, Georgia: McCallie, 1159.
- Brazer limestone, Mississippian, Idaho: Mansfield, 1211, 1216.
- Brazos sandstone, Pennsylvanian, Texas: Plummer, 1475.
- Breckenridge formation, Pennsylvanian, Texas: Plummer, 1475.
- Breckenridge limestone, Pennsylvanian, Texas: Snider, 1736.
- Brentwood limestone member, Pennsylvanian, Arkansas: Miser, 1319.
- Bridgeburg horizon, Silurian, New York: Williams, 2034.
- Bridger formation, Tertiary, Wyoming: Schultz, 1639.
- Brier slate, pre-Cambrian, Michigan: Allen, 25.
- Brigham formation, Cambrian, Idaho: Mansfield, 1211.
- Britannia formation, Devon-Carboniferous (?), British Columbia: Schofield, 1616.
- Broadback series, pre-Cambrian, Quebec: Cooke, 401.
- Brock series, pre-Cambrian, Quebec: Cooke, 401.
- Brookline conglomerate member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Brookville clay, Pennsylvanian, Ohio: Stout, 1794.
- Brownstown marl, Cretaceous, Arkansas: Miser, 1319.
- Brownstone sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Brule formation, Oligocene, South Dakota: O'Harra, 1389.
- Brush Creek limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Brush Creek limestone, Pennsylvanian, Ohio: Stout, 1794.
- Bryant limestone, Ordovician, Missouri: Foerste, 603.
- Buchanan gravels, Pleistocene: Baker, 56.
- Buckhorn limestone, Utah: Wichman, 2024.
- Buckingham series, pre-Cambrian, Quebec: Wilson, 2051.

- Buck Point sandstone, Pennsylvanian, Oklahoma: Robinson and Mills, 1559.
- Bucks Bridge mixed beds, Ordovician, New York: Chadwick, 310.
- Buda formation, Cretaceous, Texas: Sellards, 1653.
- Buda limestone, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Snider, 1736; Udden, 1880.
- Buffalo cement bed, Silurian, New York: Williams, 2034.
- Buffalo sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Buffalo shales, Ordovician, Missouri: Foerste, 603.
- Buffalo Wallow formation, Mississippian, Indiana: Malott and Thompson, 1206.
- Buffalo Wallow, Mississippian, Kentucky: Miller, 1293.
- Bulla conglomerate, Miocene, Dominican Republic: Cooke, 400.
- Bullhead Mountain formation, Cretaceous, British Columbia: Stewart, 1767.
- Bunger formation, Pennsylvanian, Texas: Plummer, 1475.
- Burgen sandstone, Ordovician, Oklahoma: Snider, 1736.
- Burgess sand, Pennsylvanian, Kansas: Moore, 1346.
- Burke formation, Algonkian, Idaho: Jones, 944.
- Burlingame limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Burlington limestone, Mississippian, Illinois: Coryell, 410.
- Burlingame limestone, Pennsylvanian, Kansas: Snider, 1736.
- Burlington limestone (Osagian), Mississippian, Missouri: Branson, 190.
- Burro terrane, Cambrian, New Mexico: Keyes, 993.
- Buxton formation, Pennsylvanian, Oklahoma: Snider, 1736.
- Byer, Mississippian, Ohio: Miller, 1293.
- Byram marl, Tertiary, Mississippi: Lowe, 1138.
- Cabot Head shale member, Silurian, Ontario: Williams, 2034.
- Cache Creek series, Carboniferous, British Columbia: Reinecke, 1538.
- Caddell beds, Tertiary, Texas: Dumble, 524.
- Caimito formation, Oligocene, Canal Zone: MacDonald, 1170; Vaughan, 1910.
- Calhoun shale, Pennsylvanian, Kansas: Snider, 1736.
- Calhoun shale member, Pennsylvanian, Kansas: Moore, 1346.
- Callaway limestone, Devonian, Missouri: Branson, 190.
- Caloosahatchee formation, Pliocene, Florida: Sellards, 1647.
- Caloosahatchee marl, Pliocene, Florida: Sellards, 1646.
- Caloosahatchee marls, Tertiary, Florida: Sellards, 1648.
- Camas basalt, Tertiary, Washington: Weaver, 1970.
- Cambridge limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Cambridge limestone, Pennsylvanian, Ohio: Stout, 1794.
- Cambridge slate member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Camden chert, Devonian, Tennessee: Dunbar, 525.
- Camillus shale member, Silurian, Ontario: Williams, 2034.
- Campbell Creek limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Camp Nelson substage, Ordovician, Kentucky: Miller, 1293.
- Caney shale, Mississippian, Oklahoma: Decker, 483.
- Cannelton limestone, Pennsylvanian, West Virginia: Hennen, 797.
- Cannon limestone, Ordovician, Tennessee: Galloway, 633.
- Cannonball marine member, Cretaceous or Tertiary, North Dakota: Leonard, 1082.
- Cannonball marine member of Lance formation, Tertiary (?), North and South Dakota: Stanton, 1756.
- Canton terrace, Tertiary, Mississippi: Lowe, 1138.
- Cantwell formation, Tertiary, Alaska: Capps, 291, 294.
- Canyon division, Pennsylvanian, Texas: Plummer, 1475.
- Canyon formation, Pennsylvanian, Texas: Matteson, 1231; Snider, 1736.
- Canyon Large terrane, Oligocene, New Mexico: Keyes, 993.
- Capitan limestone, Permian, New Mexico: Baker, 55.
- Capitan terrane, Permian, New Mexico: Keyes, 993.
- Cape May formation, Quaternary, New Jersey: Hay, 767.
- Cap Mountain formation, Cambrian, Texas: Snider, 1736.
- Capping quartzite, Cambrian, Arizona: Mitchell, 1322.
- Carbondale formation, Carboniferous, Illinois: Cady, 267, 268.
- Carbondale formation, Pennsylvanian, Illinois: Coryell, 410; Hinds, 841; Nebel, 1367.
- Carlin formation, Ordovician, Pennsylvanian: Field, 590.
- Carlile shale, Cretaceous, Kansas: Snider, 1736.
- Carlile shale, Cretaceous, New Mexico: Garrett, 640.
- Carlile shale, Cretaceous, South Dakota: Darton, 461.
- Carlile shale, Cretaceous, Wyoming: Collier, 388; Hancock, 735, 736.
- Carlile shale member, Cretaceous, Kansas: Moore, 1346.
- Carolina gneiss, Archean, Georgia: McCallie, 1149.
- Carrasco terrane, Cambrian, New Mexico: Keyes, 993.

- Carrizo formation, Eocene, Texas: Sellards, 1653; Snider, 1736.
- Carrizo formation, Tertiary, Texas: Dumble, 524.
- Cartersville formation, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCallie, 1159.
- Carters limestone, Ordovician, Tennessee: Galloway, 633.
- Caseyville formation, Pennsylvanian, Illinois: Weller *et al.*, 1973.
- Cason shale, Ordovician, Arkansas: Miser, 1219, 1220.
- Cassville plant shale, Permian, Ohio: Stout, 1794.
- Cassville shale, Permian, Ohio: Stauffer and Schroyer, 1757.
- Castlegate sandstone, Cretaceous, Utah: Forrester, 610.
- Catahoula formation, Tertiary, Texas: Dumble, 524.
- Catahoula sandstone, Tertiary, Alabama: Brantley, 191.
- Catahoula sandstone, Tertiary, Mississippi: Lowe, 1138.
- Catahoula sandstone, Tertiary, Texas: Udden, 1880.
- Catamount schist, pre-Cambrian, New York: Alling, 28.
- Cathedral Bluffs member, Tertiary, Wyoming: Schultz, 1639.
- Cattaraugus formation, Devonian, New York and Pennsylvania: Decker, 483.
- Cave Creek formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Cayugan group, Silurian, Ontario: Williams, 2034.
- Cedar (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Cedar Creek argillite, Paleozoic, Washington: Weaver, 1970.
- Cedar Grove (Middle) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Cedar Grove (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Cedar Hills sandstone, Permian, Kansas: Snider, 1736.
- Cedar Hills sandstone member, Permian, Kansas: Moore, 1346.
- Cedar Rapids phase of Otis limestone, Devonian, Iowa: Norton, 1381.
- Cedar Valley limestone, Devonian, Illinois and Iowa: Savage, 1604.
- Center Hall formation, Ordovician, Pennsylvania: Field, 590.
- Cercado formation, Miocene, Dominican Republic: Cooke, 400; Maury, 1249.
- Cerro Gordo substage, Devonian, Iowa: Fenton, 580.
- Cevicos limestone, Oligocene, Dominican Republic: Cooke, 400.
- Chaco terrane, Oligocene, New Mexico: Keyes, 993.
- Chacra terrane, Cretaceous, New Mexico: Keyes, 993.
- Chadron formation, Oligocene, South Dakota: Darton, 461; O'Harra, 1389.
- Chagres sandstone, Pliocene, Canal Zone: MacDonald, 1170.
- Chagrin formation, Ohio: Decker, 483.
- Chaman series, Oligocene, New Mexico: Keyes, 993.
- Chambersburg limestone, Ordovician, Maryland: Bassler, 90.
- Chamiso formation, Cretaceous, New Mexico: Winchester, 2061.
- Champion shell bed, Cretaceous, Kansas: Twenhofel, 1871.
- Chanute shale, Pennsylvanian, Iowa: Tilton, 1846.
- Chanute shale, Pennsylvanian, Kansas: Snider, 1736.
- Chanute shale member, Pennsylvanian, Kansas: Moore, 1305.
- Chaquaqua terrane, Jurassic, New Mexico: Keyes, 993.
- Charlton formation, Tertiary, Georgia: McCallie, 1159.
- Chase formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Chattahoochee formation, Oligocene, Florida: Sellards, 1647.
- Chattahoochee formation, Tertiary, Florida: Sellards, 1648.
- Chattanooga black shale, Devonian, Georgia: McCallie, 1159.
- Chattanooga formation, Mississippian, Tennessee: Galloway, 633.
- Chattanooga shale, Devonian, Arkansas: Miser, 1319, 1320.
- Chattanooga shale, Devonian, Illinois: Weller, *et al.*, 1973.
- Chattanooga shale, Devonian, Kentucky: Butts, 259; Jillson, 918.
- Chattanooga shale, Devonian, Oklahoma: Snider, 1736.
- Chattanooga shale, Devonian, Tennessee: Butts, 258; Dunbar, 525.
- Chattanooga shale, Devonian and Mississippian, Kentucky: Miller, 1297.
- Chattanooga shale, Devonian or Carboniferous, Tennessee: Mather, 1227.
- Chattonooga shale, Devonian or Carboniferous, Kentucky: Shaw and Mather, 1680.
- Chautauquan group, Devonian, Tennessee: Dunbar, 525.
- Chaves terrane, Permian, New Mexico: Keyes, 993.
- Checkerboard limestone, Pennsylvanian, Oklahoma: Bloesch, 155.
- Cheggoggin Point formation, Nova Scotia: Fairbault, 572.
- Chemung formation, Pennsylvania: Decker, 483.
- Cherokee shale, Carboniferous, Oklahoma: Berger, 123.
- Cherokee shale, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346.
- Cherokee shale, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.

- Cherokee shale, Pennsylvanian, Oklahoma : Berger, 123.
- Cherryvale shale, Pennsylvanian, Iowa : Tilton, 1846.
- Cherryvale shale, Pennsylvanian, Kansas : Snider, 1736.
- Cherryvale shale member, Pennsylvanian, Kansas : Moore, 1346.
- Cheshewalla sandstone, Carboniferous, Oklahoma : Goldman, 665.
- Cheshewalla sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667 ; Robinson and Mills, 1559, 1560.
- Chester group, Mississippian, Illinois : Weller *et al.*, 1973 ; Weller, 1974, 1975.
- Chester series, Mississippian, Kentucky : Miller, 1293.
- Chesterfield limestone, pre-Cambrian, New York : Alling, 28.
- Chevelah argillite, Paleozoic, Washington : Weaver, 1970.
- Cheyenne sandstone, Comanchean, Kansas : Snider, 1736 ; Moore, 1346 ; Twenhofel, 1871.
- Chickamauga formation, Ordovician, Georgia : McCallie, 1159.
- Chico formation, Cretaceous, California : Ellis, 542 ; Kew, 979.
- Chico group, Cretaceous, Oregon : Smith and Parkard, 1728.
- Chilton (Lower) sandstone, West Virginia : Reger, 1528.
- Chilton (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 797 ; Reger, 1528.
- Chimneyhill limestone, Silurian, Oklahoma : Decker, 483.
- Chinle formation, Triassic, Arizona : Shimer, 1693.
- Chinle formation, Triassic, Utah : Clark, 344.
- Chipola marl, Miocene, Gulf States : Vaughan, 1910.
- Chiricahuan series, Cambrian, New Mexico : Keyes, 993.
- Chisna formation, Carboniferous, Alaska : Chapin, 330.
- Chitstone limestone, Triassic, Alaska : Bateman and McLaughlin, 98.
- Chloridian series, Cambrian, New Mexico : Keyes, 993.
- Choctawhatchee formation, Miocene, Florida : Sellards, 1647.
- Choctawhatchee formation, Tertiary, Florida : Sellards, 1648.
- Choctawhatchee marl, Miocene, Florida : Vaughan, 1910.
- Choptank formation, Miocene, Atlantic Coastal Plain : Vaughan, 1910.
- Chouteau limestone (Kinderhookian), Mississippian, Missouri : Branson, 190.
- Choza formation, Permian, Texas : Beede, 109.
- Christiania bed, Ordovician, Maryland : Bassler, 90.
- Chugwater formation, Triassic, Wyoming : Collier, 387, 389.
- Chupadera formation, Permian, New Mexico : Wells, 1978.
- Cibao limestone, Tertiary, Porto Rico : Hubbard, 927.
- Cibola terrane, Silurian, New Mexico : Keyes, 993.
- Cimarron group, Carboniferous, Kansas : Darton, 462.
- Cimarron group, Permian, Kansas : Moore, 1346 ; Snider, 1736.
- Cimarronian series, Permian, New Mexico : Keyes, 993.
- Cincinnati, Ordovician, Indiana : Logan, 1120.
- Cisco formation, Pennsylvanian, Texas : Matteson, 1131 ; Snider, 1736.
- Cisco division, Pennsylvanian, Texas : Plummer, 1475.
- Citronelle formation, Tertiary, Mississippi : Lowe, 1097, 1140.
- Claggett formation, Cretaceous, Montana : Bowen, 171 ; Hancock, 734.
- Claiborne formation, Eocene, Florida : Sellards, 1647.
- Claiborne formation, Tertiary, Florida : Sellards, 1648.
- Claiborne formation, Tertiary, Mississippi : Lowe, 1140.
- Claiborne group, Eocene, Texas : Snider, 1736.
- Claiborne group, Tertiary, Alabama : Brantley, 191.
- Claiborne group, Tertiary, Mississippi : Lowe, 1138.
- Claiborne group, Tertiary, Texas : Dumble, 524.
- Clarendon gravels, Pleistocene, Pennsylvania : Williams, 2032.
- Clarion sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Clarksburg limestone, Pennsylvanian, Ohio : Stout, 1794.
- Clarno formation, Eocene, Oregon : Smith and Packard, 1728.
- Clarysville sandstone, Pennsylvanian, Maryland : Swartz, 1804.
- Clayton formation, Tertiary, Alabama : Brantley, 191.
- Clayton formation, Tertiary, Mississippi : Lowe, 1138.
- Clear Creek chert, Devonian, Illinois : Savage, 1604, 1605.
- Clear Fork formation, Permian, Texas : Matteson, 1231.
- Clearwater formation, Cretaceous, Alberta : McLearn, 1188.
- Clem Creek sandstone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
- Clem Creek sandstone, Pennsylvanian, Oklahoma : Ross, 1578.
- Cleveland shale, Devonian, Ohio : Decker, 483.
- Cliff House sandstone, Cretaceous, Colorado : Collier, 386.
- Clifty limestone, Devonian, Arkansas : Miser, 1319.



- Clinton formation, Silurian, Ontario: Williams, 2034.
- Clore, Mississippian, Kentucky: Miller, 1293.
- Clore limestone, Mississippian, Illinois: Weller, 1974; Weller et al, 1973.
- Cloverly formation, Cretaceous, Wyoming: Collier, 389.
- Cloverly formation, Cretaceous, Wyoming: Hancock, 734.
- Clugston limestone, Paleozoic, Washington: Weaver, 1970.
- Coaledo formation, Eocene, Oregon: Harrison and Eaton, 761; Smith and Packard, 1728.
- Coalburg (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Coalburg (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Coamo tuff limestone, Porto Rico: Berkey, 124.
- Coamo Springs limestone series, Eocene, Porto Rico: Hodge, 837.
- Coast Range batholith, Jurassic (?), British Columbia: Dolmage, 506.
- Cobalt series, pre-Cambrian, Ontario: Cooke, 401, 407; Coleman, 382; Whitehead, 2010.
- Cobalt series, pre-Cambrian, Quebec: Cooke, 403.
- Cobleskill limestone, Silurian, New York: Jones, 951.
- Coburn formation, Ordovician, Pennsylvania: Field, 590.
- Cockfield beds, Tertiary, Mississippi: Lowe, 1138.
- Coconino sandstone, Permian, Arizona: Shimer, 1693.
- Cody shale, Cretaceous, Wyoming: Collier, 389.
- Coeymans limestone, Devonian, New York: Jones, 951.
- Coffee sand member, Cretaceous, Tennessee: Wade, 1922.
- Coffee Mill Hammock marl, Quaternary, Florida: Sellards, 1646.
- Coffeyville limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Coggon phase of Otis limestone, Devonian, Iowa: Norton, 1381.
- Cohansey sands, Quaternary, New Jersey: Hay, 767.
- Coldwater group, Cretaceous, British Columbia: Reinecke, 1538.
- Cole Canyon dolomite, Cambrian, Utah: Lindgren and Loughlin, 1105.
- Collazo shales, Tertiary, Porto Rico: Maury, 1248.
- Collier shale, Cambrian, Arkansas: Miser, 1319.
- Colorado formation, Cretaceous, Alberta: Slipper, 1712.
- Colorado group, Cretaceous, Alberta: McLearn, 1187.
- Colorado group, Cretaceous, Colorado: Henderson, 795.
- Colorado shale, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Columbia formation, Pleistocene, Tennessee: Schroeder, 1623.
- Columbia formation, Pleistocene, Texas: Dumble, 524; Snider, 1736.
- Columbia group, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Columbia lava, Neocene, Oregon: Smith and Packard, 1728.
- Columbia substage, Quaternary, Kentucky: Miller, 1293.
- Columbus limestone, Devonian, Kentucky: Miller, 1293.
- Colville quartzite, Paleozoic, Washington: Weaver, 1970.
- Colville series, Tertiary, Alaska: Dall, 451.
- Comanchean system, Kansas: Moore, 1346.
- Comanche formation, Cretaceous, Colorado: Henderson, 795.
- Comanche series, Cretaceous, Kansas: Darton, 462.
- Comanche Peak beds, Cretaceous, Texas: Dumble, 524.
- Comanche Peak formation, Cretaceous, Texas: Sellards, 1653.
- Comanche Peak limestone, Comanchean, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Comanche Peak limestone, Cretaceous, Texas: Matteson, 1231; Snider, 1736; Winton and Adkins, 2062.
- Commerce sandstone, Tertiary (?), Missouri: Dake, 441.
- Conasauga formation, Cambrian, Georgia: Hull, 880; Hull et al., 878; McCallie, 1159.
- Conception slate series, pre-Cambrian, Newfoundland: Buddington, 226.
- Conemaugh formation, Pennsylvanian, Maryland: Swartz, 1804.
- Conemaugh formation, Pennsylvanian, Ohio: Stout, 1794.
- Conemaugh series, Pennsylvanian, West Virginia: Reger, 1528.
- Conewango clay, Pleistocene, Pennsylvania: Williams, 2032.
- Connellsville sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Conococheague limestone, Cambrian, Maryland: Bassler, 90.
- Cook Mountain formation, Eocene, Texas: Snider, 1736.
- Cook Mountain formation, Tertiary, Texas: Udden, 1880.
- Cook's Mountain formation, Tertiary, Texas: Dumble, 524.
- Coon Creek member, Cretaceous, Tennessee: Wade, 1922.
- Cooper limestone, Devonian, Missouri: Branson, 190; Greger, 698.
- Coos conglomerates, Neocene, Oregon: Smith and Packard, 1728.
- Coos formation, Pliocene, Oregon: Harrison and Eaton, 761.

- Copps group, pre-Cambrian, Michigan: Allen, 25.
- Corbin granite, Archean, Georgia: Hull *et al.*, 878.
- Corinth sandstone, Pennsylvanian, Maryland: Swartz, 1804.
- Cornishville bed, Ordovician, Kentucky: Miller, 1293.
- Corozal limestone, Cretaceous (?), Porto Rico: Semmes, 1655.
- Corozal limestone, Porto Rico: Berkey, 124.
- Corrigan formation, Oligocene, Texas: Snider, 1736.
- Corrigan formation, Tertiary, Texas: Dumble, 524.
- Corryville, Ordovician, Kentucky: Miller, 1293.
- Cotter dolomite, Ordovician, Arkansas: Miser, 1319.
- Cottonwood limestone, Permian, Kansas, Oklahoma: Snider, 1736.
- Cottonwood limestone, Permian, Oklahoma: Bowen *et al.*, 172.
- Cottonwood limestone member, Permian, Kansas: Moore, 1346.
- Council Grove formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Coventry conglomerate, Ordovician, Vermont: Richardson, 1544.
- Coventry phase of Waits River limestone: Richardson, 1544, 1545.
- Cow Run sandstone, Pennsylvania, Ohio: Stout, 1794.
- Coyote terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Craghead Creek shale, Devonian, Missouri: Greger, 697.
- Craigsville limestone, Devonian, Virginia: Holden, 845.
- Cranberry Island series, Mount Desert Island, Maine: Bascom, 87.
- Creston reds, Permian, Ohio: Stauffer and Schroyer, 1757.
- Cristobal terrane, Ordovician, New Mexico: Keyes, 952.
- Crouse limestone, Permian, Oklahoma: Bowen *et al.*, 172; Snider, 1736.
- Crowsnest volcanics, Cretaceous, Alberta: Rose, 1575, 1576.
- Cruise oil zone, Tertiary, Trinidad: Macready, 1195.
- Crystal Mountain sandstone, Ordovician, Arkansas: Miser, 1319.
- Cucuracha formation, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
- Culebra beds, Oligocene, Panama Canal Zone: MacDonald *et al.*, 1171.
- Culebra formation, Oligocene, Panama Canal Zone: MacDonald, 1170; Vaughan, 1910.
- Curdsville substage, Ordovician, Kentucky: Miller, 1293.
- Curry member, pre-Cambrian, Michigan: Allen, 25.
- Cutler formation, Permian (?), Colorado: Coffin, 375.
- Cuyahoga stage, Mississippian, Kentucky: Miller, 1293.
- Cynthiana stage, Ordovician, Kentucky: Miller, 1293.
- Cypress sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Cypress sandstone, Mississippian, Indiana: Malott, 1205; Malott and Thompson, 1206.
- Cypress sandstone, Mississippian, Kentucky: Butts, 259; Miller, 1293.
- Cypress sandstone, Mississippian, Tennessee: Butts, 258.
- Cyril gypsum bed, Permian, Oklahoma: Clapp, 340.
- Dagmar limestone, Cambrian, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- "Dakota" formation, Cretaceous, Colorado: Crawford *et al.*, 416; Henderson, 795; Perini and Collins, 1461.
- Dakota formation, Cretaceous, Wyoming: Hancock, 737.
- Dakota group, Cretaceous, Colorado: Lee, 1047.
- Dakota sandstone, Cretaceous, Kansas: Darton, 462; Moore, 1346; Snider, 1736.
- Dakota sandstone, Cretaceous, New Mexico: Baker, 55; Garrett, 640; Wells, 1978; Winchester, 2061.
- Dakota sandstone, Cretaceous, North Dakota: Leonard, 1082.
- Dakota sandstone, Cretaceous, Utah: Clark, 344.
- Dakota stage, Cretaceous, Iowa: Tilton, 1847.
- Dakota (Lower), Cretaceous, Kansas: Twenhofel, 1871.
- Dakota (Upper), Cretaceous, Kansas: Twenhofel, 1871.
- "Dannemora" formation, pre-Cambrian, New York: Alling, 28.
- Datil formation, Tertiary, New Mexico: Winchester, 2061.
- Davenport (Lower) limestone, Devonian, Iowa: Norton, 1381.
- Davenport (Upper) limestone, Devonian, Iowa: Norton, 1381.
- Day Creek dolomite, Permian, Kansas: Snider, 1736.
- Day Creek dolomite member, Permian, Kansas: Moore, 1346.
- Dayton limestone, Silurian, Ohio: Foerste, 598.
- Deadman limestone, Triassic (?), Idaho: Mansfield, 1211, 1214, 1216.
- Decatur limestone, Silurian, Tennessee: Dunbar, 525.
- Decatur sand, Tertiary, Mississippi: Lowe, 1138.
- Decaturville chert, Devonian, Tennessee: Dunbar, 525.
- De Cew waterlime member, Silurian, Ontario: Williams, 2034.
- Decorah shale, Ordovician, Minnesota: Grout and Soper, 715.
- Decota sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.

- Deer Creek limestone, Pennsylvanian, Kansas: Snider, 1736.
- Deer Creek limestone, Pennsylvanian, Oklahoma, Heald, 777; Heald and Mather, 780.
- Deer Creek limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Deer Lake argillite, Paleozoic, Washington: Weaver, 1970.
- Deer Trail argillite, Paleozoic, Washington: Weaver, 1970.
- Degonia sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- De Kalb limestone (Drum), Pennsylvanian, Iowa: Tilton, 1846.
- Delaware limestone, Devonian, Kentucky: Miller, 1293.
- Delaware (Sellersburg) limestone, Devonian, Kentucky: Miller, 1299.
- Delaware Mountain formation, Permian, New Mexico: Baker, 55.
- Del Rio clay, Cretaceous, Texas: Christner and Wheeler, 339; Snider, 1736; Udden, 1880.
- Del Rio clays, Cretaceous, Texas: Dumble, 524.
- Del Rio formation, Cretaceous, Texas: Sellards, 1653.
- Denton formation, Comanchean, Texas: Adkins, 6; Adkins and Winton, 7.
- Denton marl, Cretaceous, Texas: Winton and Adkins, 2062.
- Denver beds, Cretaceous, Colorado: Henderson, 795.
- De Queen limestone member, Cretaceous, Arkansas: Miser, 1319.
- Des Moines group, Pennsylvanian, Kansas: Moore, 1346; Snider, 1736.
- Des Moines stage, Pennsylvanian, Iowa: Tilton, 1846.
- Devil's River limestone, Cretaceous, Texas: Christner and Wheeler, 339.
- Dewey limestone, Carboniferous, Oklahoma: Goldman, 666.
- Dewey limestone, Pennsylvanian, Oklahoma: Ross, 1578; Snider, 1736.
- Dewitt formation, Tertiary, Texas: Udden, 1880.
- Dexter sands, Cretaceous, Texas: Shuler, 1696.
- Dierks limestone lentil, Cretaceous, Arkansas: Miser, 1319.
- Dighton conglomerate, Carboniferous, Massachusetts and Rhode Island: Perkins, 1462.
- Dillard formation, Jurassic, Oregon: Smith and Packard, 1728.
- Dimple formation, Pennsylvanian, Texas: Böse, 161; Moore, 1344.
- Dingess limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Dinwoody formation, Carboniferous, Wyoming: Collier, 387.
- Dinwoody formation, Carboniferous and Triassic, Wyoming: Collier, 389.
- "Dixon" graphite schist, pre-Cambrian, New York: Alling, 28.
- Dockum beds, Triassic, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Documan series, Triassic, New Mexico: Keyes, 993.
- Dog Creek shale, Permian, Kansas: Snider, 1736.
- Dog Creek shale member, Permian, Kansas: Moore, 1346.
- Dolores formation, Triassic, Colorado: Coffin, 375.
- Doloresian series, Triassic, New Mexico: Keyes, 993.
- Don beds, Pleistocene, Ontario: Baker, 56.
- Dorchester slate member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Dothan formation, Jurassic, Oregon: Smith and Packard, 1728.
- Dothan limestone, Pennsylvanian, Texas: Plummer, 1475.
- Dotson sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Dotson (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Double Mountain formation, Permian, Texas: Matteson, 1231.
- Douglas formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346; Snider, 1736.
- Douglas shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Doyle shale, Permian, Kansas: Snider, 1736.
- Doyle shale member, Permian, Kansas: Moore, 1346.
- Dragoonan series, Cambrian, New Mexico: Keyes, 993.
- Draney limestone, Cretaceous (?), Idaho: Mansfield, 1216.
- Dresbach sandstone, Cambrian, Minnesota: Grout and Soper, 715.
- Dresbach formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- Dresden par amphibolite, pre-Cambrian, New York: Alling, 28.
- Dripping Spring quartzite, Cambrian, Arizona: Ransome, 1507.
- Drum limestone, Pennsylvanian, Kansas: Snider, 1736.
- Drum limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Duck Creek formation, Comanchean, Texas: Adkins, 6; Snider, 1736.
- Duck Creek formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Duluth gabbro, pre-Cambrian, Minnesota: Grout and Broderick, 716.
- Dunkard series, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- Dunvegan formation, Cretaceous, Alberta: McLearn, 1197, 1198.
- Dunvegan formation, Cretaceous, British Columbia: Stewart, 1767.
- Duplin marl, Miocene, Atlantic Coastal Plain: Vaughan, 1910.

- Duplin marl, Tertiary, Georgia: McCallie, 1159.
- Dutch Creek sandstone, Devonian, Illinois: Savage, 1604, 1605.
- Dyer Bay dolomite lentil, Silurian, Ontario: Williams, 2034.
- Eagle limestone and shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eagle sandstone, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Eagle sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eagle Creek formation, Tertiary, Oregon: Smith and Packard, 1728.
- Eagle Creek formation, Tertiary, Washington and Oregon: Chaney, 325.
- Eagle Ford formation, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Sellards, 1653; Shuler, 1696; Snider 1736; Udden, 1880.
- Eagleford shales, Cretaceous, Texas: Winton and Adkins, 2062.
- Eagle Mountain quartzite, Paleozoic, Washington: Weaver, 1970.
- Early Bird formation, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Early Bird formation, Paleozoic, British Columbia: Schofield, 1619.
- Eastland formation, Pennsylvanian, Texas: Plummer, 1475.
- Eastland limestone, Pennsylvanian, Texas: Snider, 1736.
- East Lynn sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- East Lynn (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Eddy terrane, Permian, New Mexico: Keyes, 993.
- Eden formation, Ordovician, Kentucky: Miller, 1293.
- Edmonton formation, Cretaceous, Alberta: Allan, 20; Slipper, 1712.
- Edwards formation, Comanchean, Texas: Adkins, 6.
- Edwards formation, Cretaceous, Texas: Sellards, 1653.
- Edwards limestone, Comanchean, Texas: Liddle and Prettyman, 1102.
- Edwards limestone, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524; Snider, 1736; Udden, 1880; Winton and Adkins, 2062.
- Ekwan River limestone, Silurian, Canada: Savage and Van Tuyl, 1603.
- Elbrook formation, Cambrian, Maryland: Bassler, 90.
- Elgin sandstone, Pennsylvanian, Kansas: Moore, 1346.
- Elgin sandstone, Pennsylvanian, Oklahoma: Heald and Bowen, 778; Snider, 1736.
- Eliot phyllite, Carboniferous (?), Maine and New Hampshire: Wandke, 1943.
- Elk River beds, Pleistocene, Oregon: Smith and Packard, 1728.
- Ellenberger limestone, Cambro-Ordovician, Texas: Snider, 1736.
- Ellenberger limestone formation, Cambro-Ordovician, Texas: Matteson, 1231.
- Ellenburger formation, Texas: Sellards, 1652, 1654.
- Ellenburger limestone, Ordovician, Texas: Udden, 1880.
- Ellerslie sandstone, Pennsylvanian, Maryland: Swartz, 1804.
- Elmdale shale, Pennsylvanian, Kansas: Snider, 1736.
- Elmdale shale member, Pennsylvanian, Kansas: Moore, 1346.
- Elm Grove limestone, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- El Pasan series, Ordovician, New Mexico: Keyes, 993.
- El Paso limestone, Ordovician, Texas: Udden, 1880.
- Elvins formation, Cambrian, Missouri: Tarr, 1817.
- Elwren sandstone, Mississippian, Indiana: Malott and Thompson, 1206.
- Elwren sandstone and shale, Mississippian, Indiana: Malott, 1205.
- Embar group, Carboniferous, Wyoming: Collier, 387.
- Embar group, Carboniferous and Triassic, Wyoming: Collier, 389.
- Emerald dolomite member, Ordovician, Utah: Lindgren and Loughlin, 1105.
- Emmitsburg facies of Newark system, Triassic, Maryland: Dorsey, 510.
- Emperador limestone, Oligocene, Panama Canal Zone: MacDonald, 1170; MacDonald *et al.*, 1171; Vaughan, 1910.
- Empire beds, Oligocene, Oregon: Smith and Packard, 1728.
- Empire formation, Pliocene, Oregon: Harrison and Eaton, 761.
- Emporia limestone, Pennsylvanian, Kansas: Snider, 1736.
- Emporia shale member, Pennsylvanian, Kansas: Moore, 1346.
- Engadine dolomite, Michigan: Ehlers, 539.
- Enid formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Enid formation, Permian, Oklahoma: Clapp, 340.
- Enterprise green marl, Tertiary, Mississippi: Lowe, 1138.
- Enterprise shale, Permian, Kansas: Snider, 1736.
- Enterprise shale member, Permian, Kansas: Moore, 1346.
- Ephraim conglomerate, Cretaceous (?), Idaho: Mansfield, 1216.
- Eramosa member, Silurian, Ontario: Williams, 2034.
- Erwin quartzite, Cambrian, Virginia: Stose *et al.*, 1786.
- Escabrosa limestone, Mississippian, Arizona: Mitchell, 1322.

- Escondido beds, Cretaceous, Texas: Udden, 1880.
- Eskridge shale, Pennsylvanian, Kansas: Snider, 1736.
- Eskridge shale member, Pennsylvanian, Kansas: Moore, 1346.
- Esopus grit, Devonian, New York: Jones, 951.
- Estill, Silurian, Kentucky: Miller, 1293.
- Etchegoin formation, Tertiary, California: Pack, 1415.
- Eutaw formation, Cretaceous, Alabama: Brantley, 191.
- Eutaw formation, Cretaceous, Georgia: McCallie, 1159.
- Eutaw formation, Cretaceous, Georgia, Alabama, and Tennessee: Berry, 129.
- Eutaw formation, Cretaceous, Mississippi: Lowe, 1138, 1140.
- Eutaw formation, Cretaceous, Tennessee: Wade, 1922.
- Everton formation, Ordovician, Missouri: Dake, 441.
- Everton limestone, Ordovician, Arkansas: Miser, 1319.
- Ewing limestone, Pennsylvanian, Ohio: Stout, 1794.
- Exter (?) formation, Triassic, New Mexico: Garrett, 640.
- Exter terrane, Jurassic, New Mexico: Keyes, 993.
- Fairmount, Ordovician, Kentucky: Miller, 1293.
- Fajardo shales, Porto Rico: Berkey, 124.
- Falkirk dolomite, Silurian, New York: Williams, 2034.
- Farnham formation, Ordovician, Quebec: Knox, 1030.
- Faulconer bed, Ordovician, Kentucky: Miller, 1293.
- Faxon limestone, pre-Cambrian, New York: Alling, 28.
- Fayette formation, Eocene, Texas: Snider, 1736.
- Fayette substage, Tertiary, Texas: Dumble, 524.
- Fayetteville shale, Mississippian, Arkansas: Miser, 1319.
- Fayetteville shale, Mississippian, Oklahoma: Snider, 1736.
- Fernando formation, Pliocene, California: Kew, 979, 980.
- Fernie formation, Jurassic, Alberta: Rose, 1575, 1576.
- Fernie formation, "Juratrias," Alberta: MacVicar, 1196.
- Fernvale limestone, Ordovician, Arkansas: Miser, 1319, 1320.
- Fernvale formation, Ordovician, Tennessee: Mather, 1227.
- Fernow rhyolite, Utah: Lindgren and Loughlin, 1105.
- Ferron sandstone, Cretaceous, Utah: Clark, 344.
- Fincher sand, Mississippian, Texas: Matteson, 1231.
- Fish Creek argillite, Paleozoic, Washington: Weaver, 1970.
- Fish Creek sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Fisher quartz latite, Tertiary, Colorado: Patton, 1454.
- Fish Haven dolomite, Ordovician, Idaho: Mansfield, 1211.
- Fish House clays, Quaternary, New Jersey: Hay, 767.
- Flaming Gorge formation, Jurassic, Utah: Butler, 255.
- Flat Gap Member, Devonian, Tennessee: Dunbar, 525.
- Flathead sandstone, Cambrian, Wyoming: Collier, 389.
- Flattop Mountain sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Flaxman formation, Pleistocene, Alaska: Leffingwell, 1074.
- Fleming clay, Tertiary, Texas: Udden, 1880.
- Fleming formation, Tertiary, Texas: Dumble, 524.
- Florence flint, Permian, Kansas: Snider, 1736.
- Florence flint member, Permian, Kansas: Moore, 1346.
- Florencia formation, Pleistocene: Baker, 56.
- Flowerpot shale, Permian, Kansas: Snider, 1736.
- Flowerpot shale member, Permian, Kansas: Moore, 1346.
- Floyd shale, Carboniferous, Georgia: McCallie, 1159.
- Folley limestone, Ordovician, Missouri: Foerste, 603.
- Foraker limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172; Snider, 1736.
- Foraker limestone member, Carboniferous, Kansas and Oklahoma: Twenhofel, 1867.
- Forest Hill sand, Tertiary, Mississippi: Lowe, 1138.
- Forest Hill (Madison) sand, Tertiary, Mississippi: Lowe, 1138.
- Fort Hall formation, Triassic, Idaho: Mansfield, 1211, 1216.
- Fort Hays limestone member, Cretaceous, Kansas: Moore, 1346.
- Fort Payne chert, Mississippian, Kentucky: Miller, 1297; Shaw and Mather, 1680.
- Fort Payne chert, Mississippian, Tennessee: Mather, 1227.
- Fort Payne formation, Mississippian, Kentucky: Butts, 259.
- Fort Payne formation, Mississippian, Tennessee: Butts, 258; Galloway, 633.
- Fort Pierre group, Cretaceous, Colorado: Henderson, 794.
- Fort Riley limestone, Permian, Kansas: Snider, 1736.
- Fort Riley limestone member, Permian, Kansas: Moore, 1346.
- Fort Scott limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.

- Fort Scott limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Fort Thompson beds, Pleistocene, Florida: Sellards, 1646, 1647, 1648.
- Fort Union formation, Tertiary, Montana: Hancock, 734.
- Fort Union formation, Tertiary, North and South Dakota: Stanton, 1756.
- Fort Union formation, Tertiary, North Dakota: Leonard, 1082.
- Fort Union formation, Tertiary, Wyoming: Hewitt, 811.
- Fort Wayne chert, Carboniferous, Georgia: McCallie, 1159.
- Fort Worth formation, Comanchean, Texas: Adkins, 6.
- Fort Worth formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Fountain formation, Pennsylvanian, Colorado: Henderson, 795.
- Fox Hills beds, Cretaceous, Colorado: Henderson, 794.
- Fox Hills formation, Cretaceous, Colorado: Henderson, 795.
- Fox Hills group, Cretaceous, Colorado: Henderson, 794.
- Fox Hills sandstone, Cretaceous, North and South Dakota: Stanton, 1756.
- Fox Hills sandstone, Cretaceous, North Dakota: Leonard, 1082.
- Fox Hills (?) sandstone, Cretaceous, South Dakota: Darton, 461.
- Fox Hills sandstone, Cretaceous, Wyoming: Hancock, 735.
- Franciscan series, Jurassic (?) California: Kew, 980.
- Franconia formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- Franconia sandstone, Cambrian, Minnesota: Grout and Soper, 715.
- Franks conglomerate, Pennsylvanian, Oklahoma: Bloesch, 155; Decker, 483.
- Fraser River formation, Cretaceous, British Columbia: Reinecke, 1538.
- Frederick limestone, Ordovician, Maryland: Bassler, 90.
- Fredericksburg, Cretaceous, Texas: Dumble, 524.
- Fredericksburg division, Comanchean, Texas: Liddle and Prettyman, 1102; Snider, 1736.
- Fredericksburg division, Cretaceous, Texas: Winton and Adkins, 2062.
- Fredericksburg formation, Cretaceous, Texas: Adkins and Winton, 7.
- Fredericksburg terrane, Comanchean, New Mexico: Keyes, 993.
- Fredonia, Mississippian, Kentucky: Miller, 1293.
- Fredonia limestone member, Mississippian, Illinois: Weller *et al.*, 1973.
- Fredonia oolite, Mississippian, Indiana: Malott and Thompson, 1206.
- Fredonia oolite, Mississippian, Tennessee: Butts, 258.
- Freeport (Lower) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Lower) limestone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Lower) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Lower) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Upper) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Upper) limestone, Pennsylvanian, West Virginia: Reger, 1528.
- Freeport (Upper) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Freeport (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Frio formation, Eocene, Texas: Snider, 1736.
- Frustrated terrane, Ordovician, New Mexico: Keyes, 993.
- Frontier formation, Cretaceous, Wyoming: Collier, 388, 389; Schultz, 1639.
- Fulton bed, Ordovician, Kentucky: Miller, 1293.
- Fulton green shale, Pennsylvanian, Ohio: Stout, 1794.
- Furnaceville (Sodus) shale member, Silurian, Ontario: Williams, 2034.
- Fuson formation, Cretaceous, Wyoming: Hancock, 735, 737.
- Galena formation, Ordovician, Illinois: Cady, 267, 270.
- Galena limestone, Ordovician, Minnesota: Grout and Soper, 715.
- Galesburg shale, Pennsylvanian, Iowa: Tilton, 1846.
- Galesburg shale, Pennsylvanian, Kansas: Snider, 1736.
- Galesburg shale member, Pennsylvanian, Kansas: Moore, 1346.
- Galesteo terrane, Miocene, New Mexico: Keyes, 993.
- Galice formation, Jurassic, Oregon: Smith and Packard, 1728.
- Galisteo formation, Tertiary, New Mexico: Baker, 55.
- Gallatin limestone, Cambrian, Wyoming: Collier, 389.
- Gallego sandstone member, Cretaceous, New Mexico: Winchester, 2061.
- Gallegos terrane, Permian, New Mexico: Keyes, 993.
- Gallinas terrane, Cretaceous, New Mexico: Keyes, 993.
- Gannett group, Cretaceous (?), Idaho: Mansfield, 1216.
- Gaptank formation, Pennsylvanian, Texas: Böse, 161.
- Garden City limestone, Ordovician, Idaho: Mansfield, 1211.
- Gardner dolomite, Mississippian, Utah: Lindgren and Loughlin, 1105.
- Gardner formation, Utah: Wichman, 2024.
- Garnuan series, Proterozoic, New Mexico: Keyes, 993.

- Garrard, Ordovician, Kentucky: Miller, 1293.
- Garrett terrane, Comanchean, New Mexico: Keyes, 993.
- Garrison limestone and shale, Permian, Kansas: Snider, 1736.
- Garrison limestone and shale member, Permian, Kansas: Moore, 1346.
- Gasconade formation, Ordovician, Missouri: Tarr, 1817.
- Gasper, Mississippian, Kentucky: Miller, 1293.
- Gasper oolite, Mississippian, Indiana: Malott and Thompson, 1206.
- Gasper oolite, Mississippian, Kentucky: Butts, 259.
- Gasper oolite, Mississippian, Tennessee: Butts, 258.
- Gasport dolomite member, Silurian, Ontario: Williams, 2034.
- Gatun formation, Miocene, Panama Canal Zone: MacDonald, 1170; Vaughan, 1910.
- Gatun formation, Miocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Gaudalupe formation, Permian, New Mexico: Merritt, 1280.
- Gaysport member, Pennsylvanian, Ohio: Stout, 1794.
- Genundewa formation, Devonian, New York: Hussakof and Bryant, 884.
- Georgetown formation, Cretaceous, Texas: Sellards, 1653; Snider, 1736.
- Georgetown formation, Cretaceous, Texas: Udden, 1880.
- Georgetown limestone, Cretaceous, Texas: Christner and Wheeler, 339; Dumble, 524.
- Gerome andesite, Tertiary, Washington: Weaver, 1970.
- Giants Range granite, pre-Cambrian, Minnesota: Grout and Broderick, 716.
- Gila conglomerate, Quaternary, Arizona: Ransome, 1507; Schwennesen, 1640.
- Gilan series, Pleistocene, New Mexico: Keyes, 993.
- Gilbert shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Gilbert (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Gilbert (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Gilboy sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Gilliam formation, Permo-Carboniferous, Texas: Böse, 161.
- Gilmore sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Girard shales, Pennsylvania: Decker, 483.
- Glen Dean, Mississippian, Kentucky: Miller, 1293.
- Glen Dean limestone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Glen Dean limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Glen Dean limestone, Mississippian, Tennessee: Butts, 258.
- Glenn formation, Pennsylvanian, Oklahoma: Bloesch, 155.
- Glenrose formation, Cretaceous, Texas: Sellards, 1653.
- Glen Rose formation, Cretaceous, Texas: Snider, 1736; Udden, 1880.
- Glen Rose limestone, Cretaceous, Texas: Dumble, 524; Matteson, 1231; Winton and Adkins, 2062.
- Glorieta sandstone, Permian, New Mexico: Baker, 55.
- Glorietta terrane, Cretaceous, New Mexico: Keyes, 993.
- Golconda, Mississippian, Kentucky: Miller, 1293.
- Golconda formation, Mississippian, Illinois: Weller *et al.*, 1973.
- Golconda limestone, Mississippian, Illinois: Weller, 1974.
- Golconda limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Golconda limestone and shale, Mississippian, Indiana: Malott, 1205.
- Golconda shale, Mississippian, Tennessee: Butts, 258.
- Goldenville formation, Nova Scotia: Fari-bault, 572.
- Goodland formation, Cretaceous, Texas: Adkins and Winton, 7.
- Goodland limestone, Cretaceous, Arkansas: Miser, 1319.
- Goodland limestone, Cretaceous, Texas: Winton and Adkins, 2062.
- Gordon sand, Mississippian, Texas: Matteson, 1231.
- Gordon formation, Pennsylvanian, Texas: Plummer, 1475.
- Gore (Upper Mercer) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Goshen schist, Vermont: Foye, 620.
- Gosport greensand, Tertiary, Alabama: Brantley, 191.
- Gowanda beds, Devonian, New York: Chadwick, 308.
- Graford formation, Pennsylvanian, Texas: Plummer, 1475.
- Graford limestone, Pennsylvanian, Texas: Snider, 1736.
- Grainger shale, Devonian and Mississippian, Virginia: Harnsberger, 749.
- Grande terrane, Mississippian, New Mexico: Keyes, 993.
- Grand Gulf formation, Tertiary, Mississippi: Lowe, 1140.
- Grand Gulf group, Tertiary, Alabama: Brantley, 191.
- Grand Gulf group, Tertiary, Mississippi: Lowe, 1138.
- Grand Rapids formation, Cretaceous, Alberta: McLearn, 1198.
- Grand Tower limestone, Devonian, Illinois: Savage, 1604, 1605; Weller *et al.*, 1973.
- Graneros shale, Cretaceous, Kansas: Darton, 462; Snider, 1736.
- Graneros shale, Cretaceous, New Mexico: Garrett, 640.

- Graneros shale, Cretaceous, South Dakota : Darton, 461.
- Graneros shale, Cretaceous, Wyoming : Hancock, 735, 736.
- Graneros shale member, Cretaceous, Kansas : Moore, 1346.
- Granite Mountain porphyry, Arizona : Ransome, 1507.
- Grapevine sandstone, Pennsylvanian, West Virginia : Reger, 1528.
- Graphic terrane, Proterozoic, New Mexico : Keyes, 993.
- Grayhorse limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172.
- Grayson formation, Comanchean, Texas : Adkins, 6.
- Grayson formation, Cretaceous, Texas : Adkins and Winton, 7.
- Grayson marl, Cretaceous, Texas : Winton and Adkins, 2062.
- Grayson marls, Comanchean, Texas : Snider, 1736.
- Great Smoky formation, Cambrian, Georgia : McCallie, 1159.
- Greenbrier limestone, Mississippian, West Virginia : Reger, 1528.
- Greencastle bed, Ordovician, Maryland : Bassler, 90.
- Greendale bed, Ordovician, Kentucky : Miller, 1293.
- Greene formation, Permian, Ohio : Stauffer and Schroyer, 1757.
- Greenhorn limestone, Cretaceous, Kansas : Darton, 462 ; Snider, 1736.
- Greenhorn limestone, Cretaceous, New Mexico : Garrett, 640.
- Greenhorn limestone, Cretaceous, South Dakota : Darton, 461.
- Greenhorn limestone, Cretaceous, Wyoming : Hancock, 735, 736.
- Greenhorn limestone member, Cretaceous, Kansas : Moore, 1346.
- Greenleaf sandstone, Cretaceous, Kansas : Twenhofel, 1871.
- Green River formation, Eocene, Colorado : Lunt, 1149.
- Green River formation, Tertiary, Wyoming : Schultz, 1639.
- Green River formation, Wyoming : Schramm, 1622.
- Greer formation, Permian, Kansas : Moore, 1346 ; Snider, 1736.
- Greer formation, Permian, Texas : Beede, 109 ; Gould, 678.
- Greer terrane, Permian, New Mexico : Keyes, 993.
- Grenville, pre-Cambrian, Ontario : Miller and Knight, 1201, 1202.
- Grenville series, pre-Cambrian, New York : Alling, 26, 28 ; Miller, 1302, 1303, 1309.
- Grenville series, pre-Cambrian, Quebec : Cooke, 401 ; Wilson, 2051.
- Grimsby sandstone member, Silurian, Ontario : Williams, 2034.
- Grizzly Bear formation, Cretaceous, Alberta : Slipper, 1712.
- Grizzly Peak rhyolite, Tertiary, Colorado : Howell, 874.
- Gros Ventre formation, Cambrian, Wyoming : Collier, 389.
- Guadalupian series, Permian, New Mexico : Keyes, 993.
- Guayama series, Comanchean or Cretaceous, Porto Rico : Hodge, 837.
- Gubik sand, Pleistocene, Alaska : Dall, 451.
- Guelph formation, Silurian, Ontario : Williams, 2034.
- Gunflint formation, pre-Cambrian, Minnesota : Broderick, 198.
- Gunsight formation, Pennsylvanian, Texas : Plummer, 1475.
- Gunsight limestone, Pennsylvanian, Texas : Snider, 1736.
- Gunter sandstone, Cambrian, Missouri : Dake, 441.
- Gurabo formation, Miocene, Dominican Republic : Cooke, 400 ; Maury, 1249.
- Guyandot sandstone, Pennsylvanian, West Virginia : Hennen, 797 ; Reger, 1528.
- Guyandot (Lower) sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Hackberry shale, Permian, Kansas : Snider, 1736.
- Hackberry stage, Devonian, Iowa : Fenton, 580.
- Hague gneiss, pre-Cambrian, New York : Alling, 28.
- Halleyburian, pre-Cambrian, Ontario : Miller and Knight, 1301, 1302.
- Halleybury formation, Ordovician, Ontario : Hume, 881.
- Hale formation, Pennsylvanian, Arkansas : Miser, 1319.
- Halifax slate formation, Nova Scotia : Faribault, 572.
- Hamden limestone, Pennsylvanian, Ohio : Stout, 1794.
- Hampton shale, Cambrian, Virginia : Stose *et al.*, 1786.
- Hanbury formation, pre-Cambrian, Michigan : Allen, 25.
- Hannibal formation, Mississippian, Missouri : Dake, 441.
- Hanover shale, Devonian, New York : Chadwick, 308 ; Hussakof and Bryant, 884.
- Haragan marl, Devonian, Oklahoma : Decker, 483.
- Hardin sandstone member, Mississippian, Tennessee : Galloway, 633.
- Hardinsburg, Mississippian, Kentucky : Miller, 1293.
- Hardinsburg sandstone, Mississippian, Illinois : Weller, 1974 ; Weller *et al.*, 1973.
- Hardinsburg sandstone, Mississippian, Indiana : Malott and Thompson, 1206.
- Hardinsburg sandstone, Mississippian, Tennessee : Butts, 258.
- Harper sandstone, Permian, Kansas : Snider, 1736.
- Harper sandstone member, Permian, Kansas : Moore, 1346.

- Harpers shale, Cambrian, Maryland: Bassler, 90.
- Harricanaw series, pre-Cambrian, Quebec: Tanton, 1813.
- Harriman novaculite, Devonian, Tennessee: Dunbar, 525.
- Harrison beds, Miocene, South Dakota: O'Harra, 1389.
- Harrodsburg, Mississippian, Kentucky: Miller, 1293.
- Harrodsburg limestone, Mississippian, Indiana: Logan, 1120.
- Hartridge black shale, Pennsylvania, West Virginia: Hennen, 797; Reger, 1528.
- Hartselle sandstone, Mississippian, Mississippi: Lowe, 1138.
- Hartshorne sandstone, Pennsylvanian, Arkansas: Miser, 1319.
- Hartshorne sandstone, Pennsylvanian, Oklahoma: Snider, 1736.
- Harvey conglomerate sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Hatchetigbee formation, Tertiary, Alabama: Brantley, 191.
- Hatchetigbee or Granada beds, Tertiary, Mississippi: Lowe, 1138.
- Hattiesburg clay, Tertiary, Alabama: Brantley, 191.
- Hattiesburg clay, Tertiary, Mississippi: Lowe, 1138.
- Hatton tuff lentil, Mississippian, Arkansas and Oklahoma: Miser, 1318.
- Hawkeye granite, pre-Cambrian, New York: Miller, 1305, 1309.
- Hawkins terrane, Cambrian, New Mexico: Keyes, 993.
- Hay Hollow sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Haymond formation, Pennsylvanian, Texas: Böse, 161.
- Hazelton series, Jurassic, British Columbia: O'Neill, 1390.
- Helderbergian series, Devonian, Illinois: Savage, 1604.
- Helms group, Mississippian, Texas: Beede, 110.
- Henryhouse shale, Silurian, Oklahoma: Decker, 483.
- Herington limestone, Permian, Kansas: Snider, 1736.
- Herington limestone, Permian, Oklahoma: Bowen *et al.*, 172.
- Herington limestone member, Permian, Kansas: Moore, 1346.
- Herkimer limestone, Cambrian, Utah: Lindgren and Loughlin, 1104; Wichman, 2024.
- Hermitage formation, Ordovician, Tennessee: Galloway, 633.
- Hermitage substage, Ordovician, Kentucky: Miller, 1293.
- Hermosa formation, Pennsylvanian, Colorado: Coffin, 375.
- Hertha limestone, Pennsylvanian, Iowa: Tilton, 1846.
- Hertha limestone, Pennsylvanian, Kansas: Moore and Elledge, 1347; Snider, 1736.
- Hertha limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Hess formation, Permo-Carboniferous, Texas: Böse, 161.
- Heuvelton sandstone, Cambrian, New York: Chadwick, 310.
- Hewittville beds, Ordovician, New York: Chadwick, 310.
- Hickory sandstone, Cambrian, Texas: Snider, 1736.
- Hidden Treasure limestone, Mississippian, Utah: Wichman, 2024.
- Higham grit, Triassic (?), Idaho: Mansfield, 1211, 1214, 1216.
- Highbridge stage, Ordovician, Kentucky: Miller, 1293.
- High Rock sandstone, Carboniferous, Kentucky: Browning and Russell, 206.
- Hilliard shale, Cretaceous, Wyoming: Schultz, 1639.
- Hindsville limestone member, Mississippian, Arkansas: Miser, 1319.
- Hinton formation, Mississippian, Virginia: Harnsberger, 749.
- Hinton limestone, Mississippian, West Virginia: Reger, 1528.
- Hoffman limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Hogshooter gas sand, Carboniferous, Oklahoma: Berger, 123.
- Hogshooter limestone, Pennsylvanian, Oklahoma: Ross, 1578; Snider, 1736.
- Hoing [oil] sand, Niagaran, Illinois: Coryell, 410.
- Holdenville shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Holtsclaw, Mississippian, Kentucky: Miller, 1293.
- Holly Springs sands, Tertiary, Mississippi: Lowe, 1138.
- Homewood sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Homewood (Roaring Creek) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Homewood (Tionesta) sandstone, Pennsylvania, Ohio: Stout, 1794.
- Hot Springs sandstone, Mississippian, Arkansas: Miser, 1319.
- Houten terrane, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Howard limestone, Pennsylvanian, Kansas: Snider, 1736.
- Howard limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Hulah sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Humburg formation, Mississippian, Utah: Lindgren and Loughlin, 1105.
- Hundred sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Huron shale, Ohio: Decker, 483.
- Huronian series, pre-Cambrian, Minnesota: Grout and Broderick, 716.

- Huronian (Lower) group, pre-Cambrian, Michigan: Allen, 25.
- Huronian (Upper) group, pre-Cambrian, Michigan: Allen, 25.
- Hygiene sandstone member, Cretaceous, Colorado: Henderson, 794.
- Iaeger (Lower) shale, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Iaeger (Middle) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Iaeger (Upper) shale, Pennsylvanian, West Virginia: Reger, 1528.
- Iatan (?) limestone, Carboniferous, Oklahoma: Goldman, 665.
- Iatan limestone, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Iatan limestone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Iatan limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Idaho formation, Pliocene, Oregon: Smith and Packard, 1728.
- Idaho formation, Quaternary, Idaho: Hay, 767.
- Ignek formation, Jurassic (?), Alaska: Leffingwell, 1074.
- Illinoian drift, Pleistocene: Baker, 56.
- Illinoian drift, Pleistocene, Illinois: Hinds, 832.
- Illinoian drift sheet, Quaternary, Ohio: Stout, 1794.
- Independence shale, Devonian, Iowa: Norton 1381; Thomas, 1835.
- Indian Falls stage, Silurian, Kentucky: Miller, 1293.
- Indian Hollow sands (Upper and Lower), Pleistocene, Pennsylvania; Williams, 2032.
- Indian Springs shale, Mississippian, Indiana: Malott and Thompson, 1206.
- Iola limestone, Pennsylvanian, Kansas: Snider, 1736.
- Iola limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Ione formation, Eocene, California: Clark, 341.
- Iowa series, Mississippian, Illinois: Weller, 1974.
- Iowa series, Mississippian, Illinois, Iowa and Missouri: Weller, 1975.
- Iowan drift, Pleistocene: Baker, 56.
- Irasburg conglomerate, Ordovician, Vermont: Richardson, 1544, 1545.
- Irondale limestone, Pennsylvanian, Maryland: Swartz, 1804.
- Irondequoit dolomite member, Silurian, Ontario: Williams, 2034.
- Ironside formation, Pliocene, Oregon: Smith and Packard, 1728.
- Ironwood formation, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Jackfork sandstone, Mississippian, Arkansas: Miser, 1319.
- Jacksboro limestone, Pennsylvanian, Texas: Plummer, 1475.
- Jackson formation, Tertiary, Alabama: Brantley, 191.
- Jackson formation, Tertiary, Mississippi: Lowe, 1140.
- Jackson formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Jackson group, Eocene, Texas: Snider, 1736.
- Jackson group, Tertiary, Mississippi: Lowe, 1138.
- Jacksonville formation, Miocene, Florida: Sellards, 1647, 1648.
- Jasper limestone, Ordovician, Arkansas: Miser, 1319.
- Jefferson limestone, Devonian, Idaho: Mansfield, 1211.
- Jefferson City dolomite, Ordovician, Arkansas: Miser, 1319.
- Jefferson City dolomite, Ordovician, Missouri: Branson, 190.
- Jenkins shale, Permian, Kansas: Snider, 1736.
- Jenkins shale member, Permian, Kansas: Moore, 1346.
- Jessamine substage, Ordovician, Kentucky: Miller, 1293.
- Joachim dolomite, Ordovician, Missouri: Branson, 190.
- Joachim formation, Ordovician, Missouri: Dake, 441.
- Joachim limestone, Ordovician, Arkansas: Miser, 1319, 1320.
- John Day series, Oligocene, Oregon: Smith and Packard, 1728.
- Johnsburg limestone, pre-Cambrian, New York: Alling, 28.
- Jollytown sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Jones sand, Mississippian, Texas: Matteson, 1231.
- Jonesburg sandstone, Carboniferous, Oklahoma: Goldman, 665.
- Jordan formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- Jordan sandstone, Cambrian, Minnesota: Grout and Soper, 715.
- Jornadan series, Present, New Mexico: Keyes, 993.
- Josephine formation, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Josephine formation, Paleozoic, British Columbia: Schofield, 1619.
- Juana Diaz shale, Porto Rico: Hubbard, 877.
- Juana Diaz marls, Tertiary, Porto Rico: Berkey, 124; Maury, 1248.
- Juan Ascencio chert beds, Cretaceous (?), Porto Rico: Semmes, 1655.
- Judith River formation, Cretaceous, Montana: Bowen, 171; Hancock, 734.
- Jumbo volcanics, Tertiary, Washington: Weaver, 1970.
- Juniata formation, Ordovician, Maryland: Bassler, 90.
- Kaibab limestone, Permian, Arizona: Shimer, 1693.
- Kaminis granite, pre-Cambrian, Manitoba: Hanson, 744.

- Kanawha black flint, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Kanawha group, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Kansan drift, Pleistocene: Baker, 56.
- Kansan (?) drift, Pleistocene, Illinois: Hinds, 832.
- Kansan drift, Pleistocene, Minnesota: Sardeson, 1600.
- Kansan stage, Pleistocene, Iowa: Arey, 35, 36; Tilton, 1846, 1847.
- Kansas City division, Pennsylvanian, Iowa: Arey, 35.
- Kansas City formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346, Moore and Elledge, 1347; Snider, 1736.
- Kanwaka shale, Pennsylvanian, Kansas: Snider, 1736.
- Kanwaka shale member, Pennsylvanian, Kansas: Moore, 1346.
- Kaslo schists, Jurassic, British Columbia: Bancroft, 66.
- Keene gneiss, pre-Cambrian, New York: Miller, 1303, 1304.
- Keewatin, pre-Cambrian, Ontario: Burrows and Hopkins, 246; Miller and Knight, 1301, 1302.
- Keewatin series, pre-Cambrian, Ontario: Knight *et al.*, 1015.
- Keg Creek formation, Tertiary, Georgia: McCallie, 1159.
- Kelly limestone, Mississippian, New Mexico: Wells, 1978.
- Kendrick shale, Carboniferous, Kentucky: Jilson, 861, 872.
- Kennecott formation, Jurassic, Alaska: Bateman and McLaughlin, 98.
- Keokuk formation, Mississippian, Illinois: Nebel, 1367.
- Keokuk limestone, Mississippian, Illinois: Coryell, 410; Hinds, 832.
- Kessler limestone member, Pennsylvanian, Arkansas: Miser, 1319.
- Keweenaw, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
- Keweenaw series, pre-Cambrian, Minnesota: Grout and Broderick, 716.
- Keweenaw series, Minnesota: Grout and Soper, 715.
- Key Largo limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Key West limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Kiamitia formation, Comanchean, Texas: Adkins, 6.
- Kiamitia formation, Cretaceous, Texas: Adkins and Winton, 7.
- Kiamitia marl, Cretaceous, Texas: Winton and Adkins, 2062.
- Kiask series, pre-Cambrian, Ontario: Cooke, 401.
- Kimmswick limestone, Ordovician, Arkansas: Miser, 1319, 1320.
- Kimmswick limestone, Ordovician, Missouri: Branson, 190; Foerste, 603.
- Kinderhook group, Mississippian, Illinois: Coryell, 410; Hinds, 832.
- Kinderhook group, Mississippian, Illinois and Missouri: Moore, 1343.
- Kinderhook stage, Mississippian, Kentucky: Miller, 1293.
- Kingak shale, Jurassic, Alaska: Leffingwell, 1074.
- Kingston series, Carboniferous, Rhode Island: Perkins, 1462.
- Kingston series, pre-Cambrian, New Brunswick: Bailey and Matthew, 52.
- Kinkaid limestone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Kiowa shale, Comanchean, Kansas: Snider, 1736.
- Kiowa shale, Cretaceous, Kansas: Moore, 1346.
- Kiowa shales and limestones, Cretaceous, Kansas: Twenhofel, 1871.
- Kiowa terrane, Comanchean, New Mexico: Keyes, 993.
- Kirby clays, Cretaceous, Kansas: Twenhofel, 1871.
- Kirkwood sand, Illinois: Cady, 270.
- Kiskapoo Falls limestone, Pennsylvanian, Texas: Plummer, 1475.
- Kiski volcanics, pre-Cambrian, Manitoba: Alcock, 10.
- Kisseynew gneisses, pre-Cambrian, Manitoba: Hanson, 744.
- Kitanning (Lower) clay, Pennsylvanian, Ohio: Stout, 1794.
- Kitanning (Upper) fire clay, Pennsylvanian, West Virginia: Reger, 1528.
- Kitanning (Lower) fire clay, Pennsylvanian, West Virginia: Reger, 1528.
- Kittery quartzite, Carboniferous (?), Maine and New Hampshire: Wandke, 1943.
- Knobstone sandstone, Mississippian, Indiana: Logan, 1120.
- Knox dolomite, Cambrian, Georgia: McCallie, 1159.
- Knox dolomite, Cambrian and Ordovician, Georgia: Hull *et al.*, 878.
- Kootenai (?) formation, Cretaceous, Montana: Bowen, 171.
- Kootenai formation, Cretaceous, Montana: Hancock, 734.
- Kootenay formation, Cretaceous, Alberta: MacVicar, 1196; Rose, 1576; Slipper, 1712; Stewart, 1766.
- Kootenay formation, Jurassic, Alberta: Rose, 1575.
- Krao limestone, British Columbia: Schofield, 1619.
- Labadie limestone, Pennsylvanian, Oklahoma: Robinson and Mills, 1559, 1560.
- Labette shale, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Labette shale member, Pennsylvanian, Kansas: Moore, 1346.
- La Biche formation, Cretaceous, Alberta: McLearn, 1188.
- La Biche shales, Cretaceous, Alberta: Allan, 20.

- La Cygne shale member, Pennsylvanian, Kansas: Moore, 1346.
- Ladore shale, Pennsylvanian, Iowa: Tilton, 1846.
- Ladore shale, Pennsylvanian, Kansas: Snider, 1736.
- Ladore shale member, Pennsylvanian, Kansas: Moore, 1346.
- Ladronesian series, Pennsylvanian, New Mexico: Keyes, 993.
- Lafayette formation, Pliocene, Kentucky: Miller, 1293.
- Lafayette formation, Pliocene, Tennessee: Schroeder, 1623.
- Lafayette formation, Pliocene and (?) Pleistocene, Alabama: Brantley, 191.
- Lafayette formation, Tertiary, Texas: Dumble, 524.
- Lafferty limestone, Silurian, Arkansas: Miser, 1319, 1320.
- Lagarto beds, Tertiary, Texas: Barton, 85.
- Lagarto formation, Tertiary, Texas: Dumble, 524.
- LaGrange formation, Eocene, Kentucky: Miller, 1293.
- Lagrange formation, Eocene, Tennessee: Schroeder, 1623.
- La Jara terrane, Cretaceous, New Mexico: Keyes, 993.
- Lake Bonneville beds, Utah: Lindgren and Loughlin, 1105.
- Lake Flirt marl, Quaternary, Florida: Sel-lards, 1646.
- Laketown dolomite, Silurian, Idaho: Mansfield, 1211.
- Lake Valley terrane, Mississippian, New Mexico: Keyes, 993.
- Lakota sandstone, Cretaceous, Wyoming: Hancock, 735, 737.
- Lamotte sandstone, Cambrian, Missouri: Dake, 441.
- La Muda limestone, Cretaceous (?), Porto Rico: Semmes, 1655.
- La Muda limestone, Porto Rico: Berkey, 124.
- Lana conglomerate, Vermont: Foye, 620.
- Lance formation, Cretaceous or Tertiary, North Dakota: Leonard, 1082.
- Lance formation, Eocene (?), South Dakota: Darton, 461.
- Lance formation, Tertiary (?), Montana: Bowen, 171; Hancock, 734.
- Lance formation, Tertiary (?), North and South Dakota: Stanton, 1756.
- Lance formation, Tertiary (?), Wyoming: Hancock, 735.
- Lane shale, Pennsylvanian, Kansas: Snider, 1736.
- Lane shale member, Pennsylvanian, Kansas: Moore, 1346.
- LANEY shale member, Tertiary, Wyoming: Schultz, 1639.
- Langston formation, Cambrian, Idaho: Mansfield, 1211.
- Lansing formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346; Moore and Elledge, 1347; Snider, 1736.
- Laona sandstone, Devonian, New York: Hussakof and Bryant, 884.
- Lapara formation, Tertiary, Texas: Barton, 85; Dumble, 524.
- La Plata formation, Jurassic, Colorado: Coffin, 375.
- La Plata terrane, Jurassic, New Mexico: Keyes, 993.
- Laramian series, Cretaceous, New Mexico: Keyes, 993.
- Laramie formation, Cretaceous, Colorado: Crawford *et al.*, 416; Henderson, 794, 795.
- Laramie formation, Cretaceous, Utah: Forrester, 610.
- "Laramie" formation, Cretaceous, Wyoming: Schultz, 1639.
- Lares formation, Tertiary, Porto Rico: Hubbard, 877.
- Lares shales, Tertiary, Porto Rico: Maury, 1248.
- Las Cascadas agglomerate, Eocene (?), Canal Zone: MacDonald, 1170.
- Las Salinas formation, Miocene, Dominican Republic: Cooke, 400.
- La Salle limestone, Carboniferous, Illinois: Cady, 267.
- La Salle limestone, Pennsylvanian, Illinois: Cady, 268.
- Las Matas gravels, Pliocene, Dominican Republic: Cooke, 400.
- Lauderdale chert, Mississippian: Mississippi: Lowe, 1138.
- Laurel limestone, Silurian, Kentucky: Miller, 1293.
- Laurel limestone, Silurian, Tennessee: Mather, 1227.
- Laurentian, pre-Cambrian, Canada: Cooke, 407.
- Laurentian, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
- Laurentian granite, pre-Cambrian, New York: Alling, 28.
- Lawrence shale, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Lawrence shale member, Pennsylvanian, Kansas: Moore, 1346.
- Lead Point argillite, Paleozoic, Washington: Weaver, 1970.
- Lea Park formation, Cretaceous, Alberta: Slipper, 1712.
- Lebanon formation, Ordovician, Tennessee: Galloway, 633.
- Lebo member, Tertiary, Montana: Hancock, 734.
- Lecompton limestone, Pennsylvanian, Kansas: Snider, 1736.
- Lecompton (?) limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172.
- Lecompton limestone, Pennsylvanian, Oklahoma: Heald, 777.
- Lecompton limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Lee formation, Pennsylvanian, Virginia: Harnsberger, 749.
- Leipers formation, Ordovician, Tennessee: Galloway, 633.

- Lenapah limestone, Pennsylvanian, Oklahoma: Snider, 1736.
 Lenapah limestone member, Pennsylvanian, Kansas: Moore, 1346.
 Leona formation, Pleistocene, Texas: Sellards, 1653.
 Leonard formation, Carboniferous, Texas: Beede, 111.
 Leonard formation, Permian, Texas: Beede, 109.
 Leonard formation, Permo-Carboniferous, Texas: Böse, 161.
 Le Roux terrane, Triassic, New Mexico: Keyes, 993.
 Lewis formation, Cretaceous, Colorado: Perini and Collins, 1461.
 Lewis shale, Cretaceous, Colorado: Crawford *et al.*, 416.
 Lewis shale, Cretaceous, Wyoming: Schultz, 1639.
 Lewis terrane, Cretaceous, New Mexico: Keyes, 993.
 Lewiston limestone, Devonian, Virginia: Holden, 845.
 Lewisville beds, Cretaceous, Texas: Shuler, 1696.
 Lexington limestone, Ordovician, Kentucky: Jillson, 918.
 Lexington stage, Ordovician, Kentucky: Miller, 1293.
 Liberty, Ordovician, Kentucky: Miller, 1293.
 Lilley member of the West Union formation, Silurian, Ohio: Foerste, 598, 599.
 Lime Creek stage, Devonian, Iowa: Fenton, 580.
 Linden group, Devonian, Tennessee: Dunbar, 525.
 Lingle limestone, Devonian, Illinois: Savage, 1604, 1605.
 Lisbon formation, Tertiary, Alabama: Brantley, 191.
 Lisbon formation, Tertiary, Mississippi: Lowe, 1138.
 Lisburne limestone, Mississippian, Alaska: Leffingwell, 1074.
 L'Islet formation, Cambrian, Quebec: Knox, 1030.
 Lissie formation, Quaternary, Texas: Hay, 767.
 Little Falls (?) dolomite, Cambrian, New York: Miller, 1304.
 Little Homin limestone, Pennsylvanian, Oklahoma: Heald and Mather, 780.
 Little River group, Siluro-Eo-Devonian, New Brunswick: Bailey and Matthew, 52.
 Llano Estacado terrane, Pliocene, New Mexico: Keyes, 993.
 Llanos formation, Pleistocene (?), Trinidad: Macready, 1195.
 Lockport dolomite, Silurian, New York: Giles, 651.
 Lockport dolomite formation, Silurian, Ontario: Williams, 2034.
 Lockport formation, Silurian, Ontario: Hume, 881.
 Logan formation, Mississippian, Ohio: Stout, 1794.
 Logan stage, Mississippian, Kentucky: Miller, 1293.
 Loganian, pre-Cambrian, Ontario: Miller and Knight, 1301, 1302.
 Lone terrane, Cambrian, New Mexico: Keyes, 993.
 Longdale limestone, Devonian, Virginia: Holden, 845.
 Long Rapids shale, Devonian, Canada: Savage and Van Tuyl, 1603.
 Lonsdale limestone, Carboniferous, Illinois: Cady, 267.
 Lookout formation, Carboniferous, Georgia: McCallie, 1159.
 Loon Lake granite, Mesozoic, Washington: Weaver, 1970.
 Loon River formation, Cretaceous, Alberta: McLearn, 1187, 1188.
 Loretto slate, pre-Cambrian, Michigan: Allen, 25.
 Los Puertos limestone, Tertiary, Porto Rico: Hubbard, 877.
 Lost City limestone, Pennsylvanian, Oklahoma: Bloesch, 155.
 Lost Gulch monzonite, post-Paleozoic, Arizona: Ransome, 1507.
 Lostmans River limestone, Pleistocene, Florida: Sellards, 1647, 1648.
 Loudon formation, Cambrian, Maryland: Bassler, 90.
 Louisian, Carboniferous, Mississippi Valley: Keyes, 989, 999.
 Louisville limestone, Silurian, Kentucky: Miller, 1293.
 Louisville limestone, Silurian, Tennessee: Mather, 1227.
 Loveland formation, Pleistocene: Baker, 56.
 "Lower Magnesian" limestone, Illinois: Cady, 270.
 Lower Magnesian limestone, Ordovician, Indiana: Logan, 1120.
 Lowville limestone, Ordovician, New York: Decker, 483.
 Loxley terrace, Tertiary, Mississippi: Lowe, 1138.
 Loysburg formation, Ordovician, Pennsylvania: Field, 590.
 Ludlow lignitic member, Cretaceous or Tertiary, North Dakota: Leonard, 1082.
 Ludlow lignitic member, Tertiary (?), North and South Dakota: Stanton, 1756.
 Lulbegrud shale, Silurian, Kentucky: Miller, 1293.
 Lunasan series, Pennsylvanian, New Mexico: Keyes, 993.
 Luta limestone, Permian, Kansas: Snider, 1736.
 Luta limestone member, Permian, Kansas: Moore, 1346.
 Lyell formation, Cambrian, Alberta: Walcott, 1928.
 Lykins formation, Permo-Triassic (?), Colorado: Henderson, 795.
 Lyon Mountain granite, pre-Cambrian, New York: Miller, 1305, 1309.

- Lyons formation, Pennsylvanian, Colorado: Henderson, 795.
- McAlester group, Pennsylvanian, Arkansas: Miser, 1319.
- McAlester shale, Pennsylvanian, Oklahoma: Snider, 1736.
- McBean formation, Tertiary, Georgia: McCallie, 1159.
- McCarthy shale, Triassic, Alaska: Bateman and McLaughlin, 98.
- McCune limestone, Ordovician, Missouri: Foerste, 603.
- McElmo formation, Cretaceous (?), Utah: Clark, 344.
- McElmo formation, Jurassic or Cretaceous, Colorado: Coffin, 375.
- McElmo formation, Lower Cretaceous or Jurassic, Utah: Dake, 443.
- McElmo terrane, Jurassic, New Mexico: Keyes, 993.
- McKittrick group, Tertiary, California: Pack, 1416.
- McLeansboro formation, Carboniferous, Illinois: Cady, 267, 268.
- McMurray tar sands, Cretaceous, Alberta: McLearn, 1138.
- McNairy sand, Cretaceous, Mississippi: Lowe, 1138.
- McNairy sand member, Cretaceous, Tennessee: Schroeder, 1623; Wade, 1922.
- McPherson formation, Pleistocene, Kansas: Moore, 1346.
- Madera limestone, Pennsylvanian, New Mexico: Wells, 1978.
- Maderan series, Permian, New Mexico: Keyes, 993.
- Madison (?) formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- Madison limestone, Carboniferous, Montana: Westgate, 1985.
- Madison limestone, Mississippian, Idaho: Mansfield, 1211, 1216.
- Madison limestone, Mississippian, Montana: Condit, 395.
- Madison limestone, Mississippian, Wyoming: Collier, 389.
- Magdalena beds, Pennsylvanian, Texas: Beede, 111.
- Magdalena group, Pennsylvanian, New Mexico: Baker, 55; Garrett, 640; Semmes, 1658; Wells, 1978.
- Magdalena group, Pennsylvanian, Texas: Beede, 110.
- Magothy formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Mahoning limestone, Pennsylvanian, Ohio: Stout, 1794.
- Mahoning (Lower) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Mahoning (Lower) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Mahoning (Upper) sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Mahoning (Upper) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Mainstreet formation, Comanchean, Texas: Adkins, 6.
- Mainstreet formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Mainstreet limestone, Comanchean, Texas: Snider, 1736.
- Mammoth Cave limestone series, Mississippian, Kentucky: Miller, 1293.
- Mancos formation, Cretaceous, Colorado: Perini and Collins, 1461.
- Mancos formation, Cretaceous, New Mexico: Baker, 55.
- Mancos shale, Cretaceous, Colorado: Collier, 386; Crawford *et al.*, 416.
- Mancos shale, Cretaceous, New Mexico: Wells, 1978.
- Mancos shale, Cretaceous, Utah: Clark, 344.
- Mangas terrane, Cambrian, New Mexico: Keyes, 993.
- Manistique dolomite, Michigan: Ehlers, 539.
- Manistique formation, Silurian, Michigan: Ehlers, 540.
- Manitoulin member, Silurian, Ontario: Williams, 2034.
- Mankomen formation, Carboniferous, Alaska: Chapin, 330.
- Manlius limestone, Silurian, New York: Jones, 951.
- Manning beds, Tertiary, Texas: Dumble, 524.
- Mannington sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Mansfield sandstone, Pennsylvanian, Indiana: Malott, 1205.
- Manzano group, Carboniferous, New Mexico: Baker, 55.
- Manzano group, Pennsylvanian, Texas: Beede, 111.
- Manzano group, Permian, New Mexico: Lee, 1068; Wells, 1978.
- Manzano group, Permian, Texas: Beede, 110.
- Manzano terrane, Permian, New Mexico: Keyes, 993.
- Mao adentro limestone, Miocene, Dominican Republic: Cooke, 400.
- Maquoketa formation, Ordovician, Illinois: Cady, 267.
- Maquoketa shale, Ordovician, Minnesota: Grout and Soper, 715.
- Marble Canyon formation, Carboniferous, British Columbia: Reinecke, 1538.
- Marble Falls limestone, Carboniferous, Texas: Udden, 1887.
- Marble Falls limestone, Mississippian, Texas: Matteson, 1231.
- Marble Falls limestone, Pennsylvanian, Texas: Girty, 659; Moore, 1344; Plummer, 1475; Snider, 1736.
- Marble Falls series, Pennsylvanian, Texas: Girty and Moore, 660.
- Marcy anorthosite, pre-Cambrian, New York: Miller, 1303, 1304.
- Marianna limestone, Tertiary, Alabama: Brantley, 191.
- Marianna limestone, Tertiary, Mississippi: Lowe, 1138.

- Maricopa shale, Miocene, California: Pack, 1415.
- Marietta (Lower) sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Marietta (Upper) sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Marine formation, Tertiary, Texas: Dumble, 524.
- Marion formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Marks Head marl, Miocene, Georgia: Vaughan, 1910.
- Marks Head marl, Tertiary, Georgia: McCallie, 1159.
- Marland sand, Oklahoma: Aurin, 50.
- Marlbrook marl, Cretaceous, Arkansas: Miser, 1319.
- Marmaton formation, Pennsylvanian, Kansas: Boughton, 170; Moore, 1346; Moore and Elledge, 1347; Snider, 1736.
- Martin limestone, Devonian, Arizona: Mitchell, 1322; Ransome, 1507.
- Martinez formation, Eocene, California: Kew, 979.
- Martinez group, Eocene, California: Clark, 341.
- Martinian series, Devonian, New Mexico: Keyes, 993.
- Martinsburg shale, Ordovician, Maryland: Bassler, 90.
- Mascall formation, Miocene, Oregon: Smith and Packard, 1728.
- Massillon sandstone, Pennsylvania, Ohio: Stout, 1794.
- Matawan formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Matfield shale, Permian, Kansas: Snider, 1736.
- Matfield shale member, Permian, Kansas: Moore, 1346.
- Matlagami series, pre-Cambrian, Quebec: Cooke, 401.
- Mauch Chunk, Carboniferous, Kentucky: Jillson, 918.
- Mauch Chunk series, Mississippian, West Virginia: Hennen, 797; Reger, 1528.
- Maxville limestone, Mississippian, Ohio: Stout, 1794.
- Maxwell terrane, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Maya terrane, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Mayaguez shales, Porto Rico: Berkey, 124.
- Mayes formation, Mississippian, Oklahoma: Snider, 1736.
- Maysville group, Ordovician, Tennessee: Butts, 258.
- Maysville stage, Ordovician, Kentucky: Miller, 1293.
- Mazarn shale, Ordovician, Arkansas: Miser, 1319.
- Mazomanie sandstone, Cambrian, Wisconsin: Ulrich, 1891.
- Medicine beds, Cretaceous, Kansas: Twenhofel, 1871.
- Medicine Lodge gypsum, Permian, Kansas: Snider, 1736.
- Medicine Lodge gypsum member, Permian, Kansas: Moore, 1346.
- Medina-Catacraft formation, Silurian, Ontario: Williams, 2034.
- Meganos group, Eocene, California: Clark, 341, 342.
- Memphremagog slates, Ordovician, Vermont: Richardson, 1544, 1545, 1546.
- Menard, Mississippian, Kentucky: Miller, 1293.
- Menard limestone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Mendon series, Algonkian, Vermont: Foye, 620.
- Menefee formation, Cretaceous, Colorado: Collier, 386.
- Mentor beds, Cretaceous, Kansas: Twenhofel, 1871.
- Meramec group, Mississippian, Illinois: Hinds, 832; Weller *et al.*, 1973.
- Mercer (Lower) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Mercer (Upper) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Merom sandstone, Mississippian, Indiana: Logan, 1120.
- Mesaverde formation, Cretaceous, Colorado: Crawford *et al.*, 416; Perini and Collins, 1461.
- Mesaverde formation, Cretaceous, New Mexico: Wells, 1978.
- Mesaverde formation, Cretaceous, Wyoming: Collier, 388, 389; Schultz, 1639.
- Mesaverde granite, Cretaceous, Colorado: Collier, 386.
- Mesa Verde group, Cretaceous, Utah: Forrester, 610.
- Mescal limestone, Cambrian, Arizona: Ransome, 1507.
- Mesa Verde sandstone, Colorado: Haas, 727.
- Mesa Verde terrane, Cretaceous, New Mexico: Keyes, 993.
- Metehosin basalts, Eocene, British Columbia: Cooke, 402.
- Metehosin formation, Tertiary, British Columbia: DoImage, 507.
- Meyersdale red shale, Pennsylvanian, Maryland: Swartz, 1804.
- Miami oolitic limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Miami limestone, Florida: Sellards, 1646.
- Middle Park formation, Tertiary, Colorado: Chamberlin, 312.
- Midway formation, Eocene, Texas: Sellards, 1653.
- Midway formation, Tertiary, Georgia: McCallie, 1159.
- Midway formation, Tertiary, Mississippi: Lowe, 1140.
- Midway formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Midway group, Eocene, Texas: Snider, 1736.
- Midway group, Tertiary, Alabama: Brantley, 191.
- Midway group, Tertiary, Mississippi: Lowe, 1138.

- Miguel formation, Cretaceous, New Mexico: Winchester, 2061.
- Milford series, Jurassic, British Columbia: Bancroft, 66.
- Milk River sandstones, Cretaceous, Alberta: Slipper, 1712.
- Milliken sandstone, Cretaceous, Colorado: Henderson, 794.
- Million bed, Ordovician, Kentucky: Miller, 1293.
- Millsap division, Pennsylvanian, Texas: Plummer, 1475.
- Mimbresian series, Ordovician, New Mexico: Keyes, 993.
- Mineola limestone, Devonian, Missouri: Branson, 190.
- Mineral Wells sandstone, Pennsylvanian, Texas: Plummer, 1475.
- Minnekahta limestone, Permian (?), Wyoming: Hancock, 735.
- Minnelusa sandstone, Pennsylvanian, Wyoming: Hancock, 735.
- Misenheimer shale, Devonian, Illinois: Savage, 1604, 1605.
- Mispec group, Devonian, New Brunswick: Bailey and Matthew, 52.
- Mission argillite, Paleozoic, Washington: Weaver, 1970.
- Mission sandstone, Pennsylvanian, Oklahoma: Goldman and Robinson, 667.
- Missisquoi schists, Cambrian, Vermont: Richardson, 1546.
- Mississippian series, Carboniferous, Kentucky: Shaw and Mather, 1680.
- Missouri group, Pennsylvanian, Kansas: Moore, 1346; Snider, 1736.
- Missouri stage, Pennsylvanian, Iowa: Arey, 35, 36; Tilton, 1846, 1847.
- Missouri Mountain slate, Silurian, Arkansas: Miser, 1319.
- Mistassini limestone, pre-Cambrian, Quebec: Cooke, 401.
- Mitchell limestone, Mississippian, Indiana: Logan, 1120; Malott, 1205.
- Mitchell limestone group, Mississippian, Indiana: Malott and Thompson, 1206.
- Modelo formation, Miocene, California: Kew, 979.
- Modoc terrane, Mississippian, New Mexico: Keyes, 993.
- Moenkopi formation, Triassic, Arizona: Shimer, 1693.
- Moenkopi formation, Triassic, Utah: Clark, 344.
- Momable series, pre-Cambrian, Newfoundland: Buddington, 226.
- Mona shale, Oligocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Monitor sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Monmouth formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Monongahela formation, Pennsylvanian, Maryland: Swartz, 1804.
- Monongahela formation, Pennsylvanian, Ohio: Stout, 1794.
- Monongahela series, Pennsylvanian, Kentucky: Miller, 1293.
- Monroe Creek beds, Miocene, South Dakota: O'Harra, 1389.
- Mons formation, Cambrian, Alberta: Walcott, 1928.
- Montana group, Cretaceous, Alberta: McLearn, 1187.
- Montana group, Cretaceous, Colorado: Henderson, 794.
- Montell sandstone, Pennsylvanian, Maryland: Swartz, 1804.
- Monterey group, Miocene, California: Kew, 979, 980.
- Monterey group, Tertiary, California: Pack, 1415.
- Monterey sandstone, Devonian, Virginia: Holden, 845.
- Monterey series, Tertiary, California: Stock, 1770.
- Montosa terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Montoyan series, Ordovician, New Mexico: Keyes, 993.
- Moody's Branch marls, Tertiary, Mississippi: Lowe, 1138.
- Moorefield shale, Mississippian, Arkansas: Miser, 1319, 1320.
- Moran formation, Pennsylvanian, Texas: Plummer, 1475.
- Moran limestone, Pennsylvanian, Texas: Snider, 1736.
- Morgantown sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Morne l'Enfer formation, Tertiary, Trinidad: Macreadv, 1195.
- Morrison formation, Cretaceous, Colorado: Lee, 1067.
- Morrison (?) formation, Cretaceous (?), Montana: Hancock, 734.
- Morrison formation, Cretaceous (?), Wyoming: Collier, 389; Hancock, 735, 737.
- Morrison formation, Jurassic, New Mexico: Garrett, 640.
- Morrison formation, Jurassic or Cretaceous, Colorado: Henderson, 795.
- Morrisonian series, Jurassic, New Mexico: Keyes, 993.
- Morrow group, Pennsylvanian, Arkansas: Miser, 1319.
- Mosca terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Mountain Glen shale, Devonian, Illinois: Savage, 1604, 1605.
- Mount Auburn, Ordovician, Kentucky: Miller, 1293.
- Mount Champion monzonite, pre-Cambrian, Colorado: Howell, 874.
- Mount Holley series, Algonkian, Vermont: Foye, 620.
- Mount Hope, Ordovician, Kentucky: Miller, 1293.
- Mount Marion beds, Devonian, New York: Grabau, 685.
- Mount Selman beds, Eocene, Texas: De Golyer, 485.

- Mount Selman formation, Eocene, Texas: Snider, 1736.
- Mount Selman formation, Tertiary, Texas: Dumble, 524; Udden, 1880.
- Mowry shale, Cretaceous, Wyoming: Collier, 389; Hancock, 735, 736.
- Muda limestone, Pleistocene (?). Porto Rico: Semmes, 1655.
- Murchison formation, Cambrian, Alberta: Walcott, 1928.
- Murfreesboro limestone, Ordovician, Tennessee: Galloway, 633.
- Murphy marble, Cambrian, Georgia: McCallie, 1159.
- Myrtle formation, Cretaceous, Oregon: Harrison and Eaton, 761; Smith and Packard, 1728.
- Nacatoch sand, Cretaceous, Arkansas: Miser, 1319.
- Nacatosh sand, Cretaceous, Texas: Dumble, 524.
- Nacimiento series, Eocene, New Mexico: Keyes, 993.
- Naco limestone, Pennsylvanian, Arizona: Mitchell, 1322.
- Nocogdoches formation, Tertiary, Texas: Dumble, 524.
- Naheola formation, Tertiary, Alabama: Brantley, 191.
- Naiad terrane, Silurian, New Mexico: Keyes, 993.
- Nanafalia formation, Tertiary, Alabama: Brantley, 191.
- Nanaimo formation, Cretaceous, British Columbia: Dolmage, 506.
- Nantahala slate, Cambrian, Georgia: McCallie, 1159.
- Naparima clay, Tertiary, Trinidad: Macready, 1195.
- Nashua formation, Pliocene, Florida: Sellards, 1647.
- Nashua marls, Tertiary, Florida: Sellards, 1648.
- Natchez formation, Pleistocene, Mississippi: Lowe, 1138.
- National River formation, Pennsylvanian, Alaska: Blackwelder, 151.
- Navajo sandstone, Jurassic, Utah: Clark, 344.
- Navajo terrane, Cretaceous, New Mexico: Keyes, 993.
- Navarro beds, Cretaceous, Texas: Udden, 1880.
- Navarro formation, Cretaceous, Texas: Dumble, 524; Sellards, 1650, 1653; Snider, 1736.
- Nebraska beds, Miocene, South Dakota: O'Harra, 1389.
- Nebraskan drift, Pleistocene: Baker, 56.
- Nebraskan stage, Pleistocene, Iowa: Arey, 35, 36; Tilton, 1846, 1847.
- Nelson batholith, Jurassic, British Columbia: Schofield, 1617.
- Nelson granite, Jurassic, British Columbia: Schofield, 1619.
- Nelson granodiorite, Jurassic, British Columbia: Bancroft, 66.
- Nelson River limestone, Ordovician, Canada: Savage and Van Tuyl, 1603.
- Nemenish series (?), pre-Cambrian, Canada: Cooke, 401.
- Nemenish series, pre-Cambrian, Quebec: Cooke, 407.
- Nenana gravel, Tertiary, Alaska: Capps, 291.
- Neruokpuk schist, pre-Cambrian, Alaska: Leffingwell, 1074.
- Neva limestone, Pennsylvanian, Kansas and Oklahoma: Snider, 1736.
- Neva limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172.
- Neva limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Newaukum series, pre-Puget in age, Washington: Culver, 428.
- New Glasgow series, Carboniferous, Nova Scotia: Hayes, 772.
- Newland formation, Algonkian, Idaho: Jones, 944.
- Newlon limestone and shale, Pennsylvanian, West Virginia: Reger, 1528.
- Newman limestone, Mississippian, Virginia: Harnsberger, 749.
- New Providence shale, Mississippian, Kentucky: Shaw and Mather, 1680.
- New Province shale, Mississippian, Tennessee: Butts, 258; Mather, 1227.
- New Richmond formation, Ordovician, Illinois: Cady, 267.
- New Richmond sandstone, Illinois: Cady, 266.
- New River group, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- New Scotland limestone, Devonian, New York: Jones, 951.
- Niagara group, Silurian, Ontario: Williams, 2034.
- Niagara limestone, Silurian, Kentucky: Jillson, 918; Miller, 1297.
- Niagara limestone, Silurian, New York: Giles, 651.
- Nickel Plate formation, Triassic or Jurassic, British Columbia: Schofield, 1620.
- Nicolai greenstone, Triassic, Alaska: Bateman and McLaughlin, 98.
- Nineveh limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Nineveh sandstone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Ninos terrane, Archeozoic, New Mexico: Keyes, 993.
- Niobrara formation, Cretaceous, Colorado: Henderson, 795.
- Niobrara formation, Cretaceous, Kansas: Darton, 462; Moore, 1346.
- Niobrara formation, Cretaceous, North Dakota: Leonard, 1082.
- Niobrara formation, Cretaceous, South Dakota: Darton, 461.
- Niobrara formation, Cretaceous, Wyoming: Hancock, 736.
- Niobrara shale, Cretaceous, Wyoming: Collier, 388; Hancock, 735.

- Nipissing diabase, pre-Cambrian, Ontario : Whitehead, 2010.
- Nitinat formation, Triassic (?), British Columbia : Dolmage, 506.
- Nora formation, Devonian, Iowa : Fenton, 580.
- Normanskill shales, Ordovician, New York : Jones, 951.
- Norrie member, pre-Cambrian, Wisconsin and Michigan : Hotchkiss, 865.
- Northfield conglomerate, Ordovician, Vermont : Richardson, 1545.
- North Fork shale, Pennsylvanian, West Virginia : Hennen, 797.
- Northport limestone, Paleozoic, Washington : Weaver, 1970.
- Northport terrace, Pleistocene, Alabama : Brantley, 191.
- Norton formation, Pennsylvanian, Virginia : Harnsberger, 750.
- Nounan formation, Cambrian, Idaho : Mansfield, 1211.
- Nowata shale, Pennsylvanian, Oklahoma : Snider, 1736.
- Nowata shale member, Pennsylvanian, Kansas : Moore, 1346.
- Nugget sandstone, Jurassic, Idaho : Mansfield, 1211, 1214, 1216.
- Nugget sandstone, Jurassic, Wyoming : Schultz, 1639.
- Nuttall (Lower) sandstone, Pennsylvanian, West Virginia : Hennen, 797; Reger, 1528.
- Nuttall (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 797; Reger, 1528.
- Oatka beds, Silurian, New York : Williams, 2034.
- Oak Hill clay, Pennsylvanian, Ohio : Stout, 1794.
- Oakville formation, Tertiary, Texas : Dumble, 524.
- Ocala formation, Eocene, Florida : Sellards, 1647.
- Ocala formation, Tertiary, Florida : Sellards, 1648.
- Ocala limestone, Eocene, Florida : Cushman, 431.
- Ocala limestone, Tertiary, Georgia : McCallie, 1149.
- Orca group, Mesozoic or Tertiary, Alaska : Johnson, 930.
- Orchard Creek shale, Silurian, Illinois : Savage, 1602.
- Oread limestone, Pennsylvanian, Oklahoma : Robinson and Mills, 1560.
- Ogalalla formation, Cretaceous, Kansas : Moore, 1346.
- Ogalalla formation, Tertiary, Kansas : Darton, 462.
- Ogdensburg dolomite, Ordovician, New York : Chadwick, 310.
- Ohara, Mississippian, Kentucky : Miller, 1293.
- Ohara (Lower) limestone member, Mississippian, Illinois : Weller *et al.*, 1973.
- Ohio shale, Kentucky : Miller, 1293.
- Okaw limestone, Mississippian, Illinois : Weller, 1974.
- Okaw limestone, Mississippian, Indiana : Hole, 847.
- Okay limestone, Pennsylvanian, Oklahoma : Heald, 777.
- Okefenokee formation, Quaternary, Georgia : McCallie, 1159.
- Okesa sandstone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
- Old Dominion limestone, Paleozoic (?), Washington : Weaver, 1970.
- Oldham limestone, Silurian, Kentucky : Miller, 1293.
- Olive Hill formation, Devonian, Tennessee : Dunbar, 525.
- Oneida glass sand, Pleistocene, New York : Colony, 392.
- Oneota dolomite, Ordovician, Minnesota : Grout and Soper, 715.
- Oneota formation, Ordovician, Illinois : Cady, 267.
- Oneota formation, Ordovician, Wisconsin : Twenhofel and Thwaites, 1870.
- Onondaga limestone, Devonian, Kentucky : Jillson, 918.
- Onondaga limestone, Devonian, New York : Hussakof and Bryant, 884; Jones, 951.
- Opeche formation, Permian (?), Wyoming : Hancock, 734.
- Opex dolomite, Cambrian, Utah : Lindgren and Loughlin, 1104.
- Ophir formation, Cambrian, Utah : Butler, 255; Lindgren and Loughlin, 1104; Wichman, 2024.
- Opohonga limestone, Ordovician, Utah : Lindgren and Loughlin, 1104.
- Oread limestone, Pennsylvanian, Kansas and Oklahoma : Snider, 1736.
- Oread limestone, Pennsylvanian, Oklahoma : Heald, 777; Heald and Bowen, 778.
- Oread limestone member, Pennsylvanian, Kansas : Moore, 1346.
- Oregon bed, Ordovician, Kentucky : Miller, 1293.
- Orient gneiss, pre-Cambrian (?), Washington : Weaver, 1970.
- Oriskanian group, Devonian, Tennessee : Dunbar, 525.
- Oriskany formation, Devonian, New York and Pennsylvania : Fetteke, 588.
- Oriskany sandstone, Devonian, New York : Colony, 392.
- Osage formation, Mississippian, Illinois : Weller *et al.*, 1973.
- Osgood stage, Silurian, Kentucky : Miller, 1293.
- Oswayo formation, Devonian-Carboniferous, Pennsylvania : Decker, 483.
- Otis limestone, Devonian, Iowa : Norton, 1381.
- Owen substage, Devonian, Iowa : Fenton, 580.
- Owl Creek marl, Cretaceous, Mississippi : Lowe, 1138.

- Owl Creek member, Cretaceous, Tennessee: Wade, 1922.
- Pabst member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Packard rhyolite, Utah: Lindgren and Loughlin, 1105.
- Packsaddle schist, pre-Cambrian, Texas: Snider, 1736.
- Pahasapa limestone, Mississippian, Wyoming: Hancock, 735.
- Paint Creek formation, Mississippian, Illinois: Weller *et al.*, 1973.
- Paint Creek limestone, Mississippian, Illinois: Weller, 1974.
- Paint Creek limestone, Mississippian, Indiana: Hole, 847.
- Pakowki shales, Cretaceous, Alberta: Slipper, 1712.
- Pala conglomerate, Quaternary, California: Ellis, 542.
- Palestine, Mississippian, Kentucky: Miller, 1293.
- Palestine sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Palisade andesite (Conejos formation), Tertiary, Colorado: Patton, 1454.
- Palm Beach limestone, Pleistocene, Florida: Sellards, 1647, 1648.
- Palmer volcanics, Tertiary, Washington: Weaver, 1970.
- Palms formation, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Palomasan series, Pleistocene, New Mexico: Keyes, 993.
- Palo Pinto formation, Pennsylvania, Texas: Plummer, 1475.
- Palo Pinto limestone, Pennsylvanian, Texas: Snider, 1736.
- Paluxy sand, Cretaceous, Texas: Dumble, 524; Matteson, 1231; Snider, 1736.
- Paluxy sands, Cretaceous, Texas: Udden, 1880; Winton and Adkins, 2062.
- Pamlico formation, Quaternary, North Carolina and Virginia: Hay, 767.
- Panama formation, Miocene, Canal Zone: MacDonald, 1170.
- Park formation, Carboniferous, Wyoming: Collier, 387.
- Park City formation, Carboniferous, Wyoming: Collier, 389.
- Park City formation, Permian, Wyoming: Schultz, 1639.
- Pascagoula formation, Tertiary, Alabama: Brantley, 191.
- Pascagoula clay, Tertiary, Mississippi: Lowe, 1138.
- Paskapoo formation, Tertiary, Alberta: Allan, 20; Slipper, 1712.
- Paso Robles formation, Tertiary, California: Pack, 1415.
- Patapsco formation, Cretaceous, Maryland: Berry, 141.
- Patapsco formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Patuxent formation, Cretaceous, Maryland: Berry, 141.
- Patuxent formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Pawhuska limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Pawnee Creek beds, Tertiary, Colorado: Loomis, 1123.
- Pawnee limestone, Pennsylvanian, Kansas, and Oklahoma: Snider, 1736.
- Pawnee limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Pawpaw formation, Comanchean, Texas: Adkins, 6.
- Pawpaw formation, Cretaceous, Texas: Adkins and Winton, 7; Winton and Adkins, 2062.
- Peace River formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- Pearl shale, Permian, Kansas: Snider, 1736.
- Pearl shale member, Permian, Kansas: Moore, 1346.
- Pecosian series, Pliocene, New Mexico: Keyes, 993.
- Pecurisan series, Archeozoic, New Mexico: Keyes, 993.
- Peerless sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1258.
- Pegram limestone, Devonian, Tennessee: Dunbar, 525.
- Pelican sandstone, Cretaceous, Alberta: McLearn, 1188.
- Pelican shale, Cretaceous, Alberta: McLearn, 1188.
- Penasco terrane, Archeozoic, New Mexico: Keyes, 993.
- Pence member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Pend Oreille group, Washington and British Columbia: Weaver, 1970.
- Pennington group, Mississippian, Virginia: Harnsberger, 749.
- Pennington shale, Carboniferous, Georgia: McCallie, 1159.
- Pennington shale, Mississippian, Tennessee: Butts, 258.
- Penters chert, Devonian, Arkansas: Miser, 1319, 1320.
- Peorian interglacial interval, Pleistocene: Baker, 56.
- Pepino formation, Tertiary, Porto Rico: Hubbard, 877; Maury, 1248.
- Perchan series, Devonian, New Mexico: Keyes, 993.
- Permian system, Kansas: Moore, 1346.
- Perry group, Devonian, New Brunswick: Bailey and Matthew, 52.
- Perryville substage, Ordovician, Kentucky: Miller, 1293.
- Peterson limestone, Cretaceous (?), Idaho: Mansfield, 1216.
- Phalen Lake volcanics, Tertiary, Washington: Weaver, 1970.
- Phelps sandstone, Mississippian, Missouri: Dake, 441.
- Phosphoria formation, Permian, Idaho: Mansfield, 1211, 1216.

- Phosphoria formation, Permian, Montana : Condit, 395.
- Pictured Cliffs terrane, Cretaceous, New Mexico : Keyes, 993.
- Pierre limestone, Ordovician, Tennessee : Galloway, 633.
- Pierpont sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Pierre formation, Cretaceous, Colorado : Henderson, 795.
- Pierre group, Cretaceous, Colorado : Henderson, 794.
- Pierre shale, Cretaceous, Kansas : Darton, 462; Moore, 1346; Snider, 1736.
- Pierre shale, Cretaceous, New Mexico : Garret, 640.
- Pierre shale, Cretaceous, North and South Dakota : Stanton, 1746.
- Pierre shale, Cretaceous, North Dakota : Leonard, 1082.
- Pierre shale, Cretaceous, South Dakota : Darton, 461.
- Pierre shale, Cretaceous, Wyoming : Hancock, 735, 737.
- Pike gravel member, Cretaceous, Arkansas : Miser 1319.
- Pinal schist, pre-Cambrian, Arizona : Ransome, 1507.
- Pine Canyon limestone, Mississippian, Utah : Lindgren and Loughlin, 1105.
- Pinelog conglomerate, pre-Cambrian, Georgia : Hull, 880; Hull *et al.*, 878.
- Pineville sandstone, Pennsylvanian, West Virginia : Hennen, 797; Reger, 1528.
- Pina Vititos terrane, Cretaceous, New Mexico : Keyes, 993.
- Pinyon Peak limestone, Devonian, Utah : Lindgren and Loughlin, 1105.
- Pioneer shale, Cambrian, Arizona : Ransome, 1507.
- Pitkin limestone, Mississippian, Arkansas : Miser, 1319.
- Pitkin limestone, Mississippian, Oklahoma : Snider, 1736.
- Pittsburg (Upper) limestone, Pennsylvanian, Ohio : Stout, 1794.
- Pittsburgh (Upper) sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Plattesville formation, Ordovician, Illinois : Cady, 267, 270.
- Platteville limestone, Ordovician, Minnesota : Grout and Soper, 715.
- Plattin limestone, Ordovician, Arkansas : Miser, 1319, 1320.
- Plattin limestone, Ordovician, Missouri : Foerste, 603.
- Plattsburg limestone, Pennsylvanian, Kansas : Boughton, 170; Snider, 1736.
- Plattsburg limestone member, Pennsylvanian, Kansas : Moore, 1346.
- Pleasanton shale, Pennsylvanian, Kansas : Snider, 1736.
- Plum Creek shale, Silurian, Kentucky : Miller, 1293.
- Plummer limestone, Pennsylvanian, Oklahoma : Heald and Mather, 780.
- Pluto shale, Mississippian, West Virginia : Reger, 1528.
- Plymouth member, pre-Cambrian, Wisconsin and Michigan : Hotchkiss, 865.
- Pocahontas group, Pennsylvanian, West Virginia : Hennen, 797.
- Pocahontas (Upper) sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Point Lookout sandstone, Cretaceous, Colorado : Collier, 386.
- Point Pleasant bed, Ordovician, Kentucky : Miller, 1293.
- Point Woodbury formation, Carboniferous or pre-Carboniferous, British Columbia : Schofield, 1617.
- Point Woodbury formation, Paleozoic, British Columbia : Schofield, 1619.
- Pokegama quartzite, pre-Cambrian, Minnesota : Grout and Broderick, 716.
- Polk Creek shale, Ordovician, Arkansas : Miser, 1319.
- Pomeroy sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Ponce chalk beds, Tertiary, Porto Rico : Berkey, 124; Maury, 1248.
- Ponce limestone, Porto Rico : Hubbard, 877.
- Pondville conglomerate and arkose, Carboniferous, Rhode Island : Perkins, 1462.
- Pontiac series, pre-Cambrian, Quebec : Cooke, 401; Mailhot, 1202.
- Porcupine Hills beds, Tertiary, Alberta : Slipper, 1712.
- Porcupine Hills formation, Eocene, Alberta : Stewart, 1766.
- Portage group, Devonian, Pennsylvania : Decker, 483.
- Porters Creek clay, Eocene, Kentucky : Miller, 1293.
- Porters Creek clay, Tertiary, Mississippi : Lowe, 1140.
- Porters Creek formation, Eocene, Tennessee : Schroeder, 1623.
- Porter's Creek formation, Tertiary, Mississippi : Lowe, 1138.
- Portersville member, Pennsylvanian, Ohio : Stout, 1794.
- Port Hudson beds, Quaternary, Louisiana : Emerson, 549.
- Port Hudson formation, Pleistocene, Mississippi : Lowe, 1138.
- Port Hudson formation, Pleistocene, Texas : Snider, 1736.
- Port Nelson limestone, Silurian, Canada : Savage and Van Tuyl, 1602.
- Portneuf limestone, Triassic, Idaho : Mansfield, 1211, 1216.
- Possum sandstone, Carboniferous, Oklahoma : Goldman, 665.
- Possum sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667.
- Potomac group, Cretaceous, Maryland and Delaware : Bascom and Miller, 86.
- Potomac marble, Triassic, Maryland : Dorsey, 510.
- Potosi formation, Cambrian, Missouri : Tarr, 1817.

- Potsdam sandstone, Cambrian, Indiana: Logan, 1120.
- Potsdam sandstone, Cambrian, New York: Alling, 26; Miller, 1204.
- Potsdam sandstones, Cambrian, New York: Chadwick, 310.
- Pottsboro subgroup, Comanchean, Texas: Snider, 1736.
- Pottsville conglomerate, Carboniferous, Kentucky: Jillson, 918.
- Pottsville formation, Carboniferous, Illinois: Cady, 267, 268.
- Pottsville formation, Carboniferous, Pennsylvania: Fettke, 588.
- Pottsville formation, Pennsylvanian, Illinois: Coryell, 410; Hinds, 832; Nebel, 1367.
- Pottsville formation, Pennsylvanian, Maryland: Swartz, 1804.
- Pottsville formation, Pennsylvanian, Ohio: Stout, 1794.
- Pottsville group, Pennsylvanian, Illinois: Weller *et al.*, 1973.
- Pottsville series, Pennsylvanian, Kentucky: Miller, 1293.
- Pottsville series, Pennsylvanian, West Virginia: Reger, 1528.
- Poughquag quartzite, Cambrian, New York: Colony, 392.
- Poverty Run member, Pennsylvanian, Ohio: Stout, 1794.
- Poway conglomerate, Tertiary, California: Ellis, 542.
- Powell limestone, Ordovician, Arkansas: Miser, 1319.
- Prairie du Chien group, Ordovician, Illinois: Cady, 267.
- Pruss sandstone, Jurassic, Idaho: Mansfield, 1214, 1216.
- Prichard formation, Algonkian, Idaho: Jones, 944.
- Priest River terrane, British Columbia, Idaho, and Montana: Weaver, 1970.
- Princess formation, Carboniferous or pre-Carboniferous, British Columbia: Schofield, 1617.
- Princess formation, Paleozoic, British Columbia: Schofield, 1619.
- Princeton conglomerate, Mississippian, West Virginia: Reger, 1528.
- Princeton conglomerate sandstone, Mississippian, West Virginia: Hennen, 797.
- Princeton sandstone, Mississippian, Virginia: Harnsberger, 749.
- Proctor formation, Cambrian, Missouri: Tarr, 1817.
- Pueblo formation, Pennsylvanian, Texas: Plummer, 1475.
- Pueblo limestone, Pennsylvanian, Texas: Snider, 1736.
- Puente formation, Tertiary, California: Jordan, 954.
- Puerco terrane, Eocene, New Mexico: Keyes, 953.
- Puertecito formation, Triassic, New Mexico: Wells, 1978.
- Puget series, Eocene, Washington: Culver, 428.
- Pulaski formation, Eocene, Oregon: Smith and Packard, 1728.
- Puncheon Creek sandstone, Carboniferous, Kentucky: Browning and Russell, 206.
- Purgatoire formation, Cretaceous, New Mexico: Garrett, 640.
- Putnam Hill limestone, Pennsylvanian, Ohio: Stout, 1794.
- Pyburn limestone, Devonian, Tennessee: Dunbar, 525.
- Quadrant formation, Carboniferous, Montana: Conduit, 395.
- Quall limestone, Devonian, Tennessee: Dunbar, 525.
- Quartermaster formation, Permian, Texas: Gould, 678.
- Quartermaster terrane, Permian, New Mexico: Keyes, 993.
- Quebradillas limestone, Tertiary, Porto Rico: Hubbard, 877; Maury, 1248.
- Queen Charlotte Islands formation, Cretaceous, British Columbia: Reinecke, 1538.
- Queen City beds, Tertiary, Texas: Dumble, 524.
- Queen City formation, Eocene, Texas: Snider, 1736.
- Queenston shale, Ordovician, New York: Decker, 483.
- Quinnesec schists, pre-Cambrian, Michigan: Allen, 25.
- Quinnimont sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Quinnimont sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Racine formation, Silurian, Michigan: Ehlers, 541.
- Raccoon shale, Mississippian, Kentucky: Miller, 1393.
- Raleigh (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Raleigh (Upper) sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Raleigh (Upper) (Sharon) sandstone, Pennsylvanian, West Virginia: Reger, 1528.
- Ralston group, Pennsylvanian, Oklahoma: Bloesch, 155.
- Randville dolomite, pre-Cambrian, Michigan: Allen, 25.
- Ranger formation, Pennsylvanian, Texas: Plummer, 1475.
- Ranger limestone, Pennsylvanian, Texas: Snider, 1736.
- Raritan formation, Cretaceous, Maryland and Delaware: Bascom and Miller, 86.
- Raton formation, Tertiary, New Mexico: Garrett, 640.
- Ratonian series, Cenozoic (Tertiary), New Mexico: Keyes, 993.
- Rattlesnake beds, Cretaceous, Texas: Udden, 1880.
- Rattlesnake beds, Pliocene, Oregon: Smith and Packard, 1728.

- Reagan sandstone, Cambrian, Oklahoma : Decker, 483.
- Redbank sand, Cretaceous, New Jersey : Mansfield, 1210.
- Red Bluff clay, Tertiary, Alabama : Brantley, 191.
- Red Bluff formation, Tertiary, Mississippi : Lowe, 1138.
- Red Eagle limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172 ; Snider, 1736.
- Red Mountain formation, British Columbia : Schofield, 1620.
- Red Mountain rhyolite, Tertiary, Colorado : Howell, 874.
- Red Rock Canyon beds, Tertiary, California : Merriam, 1264.
- Redstone limestone, Pennsylvanian, Ohio : Stout, 1794.
- Redtop formation, British Columbia : Schofield, 1620.
- Red Top limestone, Paleozoic (?), Washington : Weaver, 1970.
- Redwall limestone, Mississippian, Arizona : Shimer, 1693.
- Reeder, sandstone, Cretaceous, Kansas : Twenhofel, 1871.
- Reelsville limestone, Mississippian, Indiana : Malott, 1205 ; Malott and Thompson, 1206.
- Renault formation, Mississippian, Illinois : Weller *et al.*, 1973.
- Renault limestone, Mississippian, Illinois : Weller, 1974.
- Renault limestone, Mississippian, Indiana : Hole, 847.
- Republican Creek limestone, Paleozoic, Washington : Weaver, 1970.
- Revard sandstone, Pennsylvanian, Oklahoma : Robinson and Mills, 1559, 1560.
- Reyett formation, Algonkian, Idaho : Jones, 944.
- Rex chert member, Permian, Idaho : Mansfield, 1211.
- Reynales (Wolcott) dolomite member, Silurian, Ontario : Williams, 2034.
- Reynosa limestone, Texas : Barton, 85.
- Rhinestreet shale, Devonian, New York : Hussakof and Bryant, 884.
- Rhode Island formation, Carboniferous, Rhode Island : Perkins, 1462.
- Ribstone Creek formation, Cretaceous, Alberta : Slipper, 1712.
- Ricardo beds, Tertiary, California : Merriam, 1264.
- Ricardo group, Tertiary, California : Merriam, 1264.
- Riceville shale, Devonian-Carboniferous, Pennsylvania : Decker, 483.
- Richmond stage, Ordovician, Kentucky : Miller, 1293.
- Ridenhower shale, Mississippian, Kentucky : Miller, 1293.
- Ridley limestone, Ordovician, Tennessee : Galloway, 633.
- Rio de la Plata series, Comanchean, Porto Rico : Hodge, 837.
- Rio Descalabrados series, Eocene, Porto Rico : Hodge, 837.
- Rio Jueyes series, Eocene, Porto Rico : Hodge, 837.
- Ripley formation, Cretaceous, Alabama : Brantley, 191.
- Ripley formation, Cretaceous, Georgia : McCallie, 1159.
- Ripley formation, Cretaceous, Georgia and Alabama : Berry, 129.
- Ripley formation, Cretaceous, Kentucky : Miller, 1293.
- Ripley formation, Cretaceous, Mississippi : Lowe, 1138, 1140.
- Ripley formation, Cretaceous, Tennessee : Schroeder, 1623 ; Wade, 1922.
- Ripton conglomerate, Algonkian, Vermont : Foye, 620.
- Riverside sandstone, Mississippian, Indiana : Logan, 1120.
- Roan gneiss, Archean, Georgia : McCallie, 1159.
- Roaring Creek sandstone, Pennsylvanian, West Virginia : Hennen, 797.
- Rochester quartzite, Vermont : Foye, 620.
- Rochester shale formation, Silurian, Ontario : Williams, 2034.
- Rociada terrane, Archeozoic, New Mexico : Keyes, 993.
- Rockcastle sandstone, Pennsylvanian, Tennessee : Butts, 258.
- Rockford limestone, Mississippian, Indiana : Logan, 1120.
- Rockhouse shale, Devonian, Tennessee : Dunbar, 525.
- Rockmart slate, Ordovician, Georgia : McCallie, 1159.
- Rockwood formation, Silurian, Georgia : McCallie, 1159.
- Rodman formation, Ordovician, Pennsylvania : Field, 590.
- Romance arkose, Vermont : Foye, 620.
- Rome formation, Cambrian, Georgia : McCallie, 1159.
- Rondout limestone, Silurian, New York : Jones, 951.
- Rosamond series, Tertiary, California : Merriam, 1264.
- Rosebud beds, Miocene, South Dakota : O'Harra, 1389.
- Rosewood, Mississippian, Kentucky : Miller, 1293.
- Rosiclare, Mississippian, Kentucky : Miller, 1293.
- Rosiclare sandstone member, Mississippian, Illinois : Weller *et al.*, 1973.
- Ross limestone member, Devonian, Tennessee : Dunbar, 525.
- Ross Fork limestone, Triassic, Idaho : Mansfield, 1211, 1216.
- Rossland volcanic group, Triassic and Jurassic, Washington : Weaver, 1970.
- Roubidoux formation, Cambrian, Missouri : Dake, 441.
- Roubidoux formation, Ordovician, Missouri : Tarr, 1817.

- Round Knob shale, Pennsylvanian, Ohio: Stout, 1794.
- Rove slate, pre-Cambrian, Minnesota: Broderick, 198.
- Roxbury conglomerate series, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Royal shale, Pennsylvanian, West Virginia: Hennen, 797.
- Ruma formation, Mississippian, Illinois: Weller, 1974.
- Ruth argillite, Carboniferous, British Columbia: Schofield, 1619.
- Saanich granodiorite, Jurassic (?), British Columbia: Dolmage, 506.
- Sabine formation, Tertiary, Texas: Dumble, 524.
- Sacadaga quartzite, pre-Cambrian, New York: Alling, 28.
- Saddlehorse gypsum, Permian, Texas: Gould, 678.
- Sadlerochit sandstone, Pennsylvanian, Alaska: Leffingwell, 1074.
- St. Charles formation, Cambrian, Idaho: Mansfield, 1211.
- St. Clair limestone, Silurian, Arkansas: Miser, 1319, 1320.
- St. Clair marble, Silurian, Oklahoma: Snider, 1736.
- St. Edmund dolomite lentil, Silurian, Ontario: Williams, 2034.
- St. John formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- St. John formation, Cretaceous, British Columbia: Stewart, 1747.
- St. John group, Cambrian, New Brunswick: Bailey and Matthew, 52.
- St. Lawrence formation, Cambrian, Minnesota: Grout and Soper, 715.
- St. Lawrence formation, Cambrian, Wisconsin: Twenhofel and Thwaites, 1870.
- St. Lorenz limestone, Devonian, Missouri: Dake, 441.
- St. Louis formation, Mississippian, Mississippi Valley: Keyes, 999.
- St. Louis limestone, Carboniferous, Kentucky: Jillson, 918.
- St. Louis limestone, Mississippian, Illinois: Coryell, 410; Hinds, 832.
- St. Louis limestone, Mississippian, Illinois: Nebel, 1367; Weller *et al.*, 1973.
- St. Louis limestone, Mississippian, Kentucky: Butts, 259; Miller, 1297; Shaw and Mather, 1680.
- St. Louis limestone, Mississippian, Tennessee: Butts, 258; Mather, 1227.
- St. Louis stage, Mississippian, Kentucky: Miller, 1293.
- St. Mary River beds, Cretaceous, Alberta: Slipper, 1712.
- St. Mary River formation, Eocene (?), Alberta: Rose, 1576.
- St. Mary River formation, Cretaceous, Alberta: Stewart, 1766.
- St. Mary River formation, Jurassic, Alberta: Rose, 1575.
- St. Peter formation, Ordovician, Wisconsin: Twenhofel and Thwaites, 1870.
- St. Peter sandstone, Ordovician, Arkansas: Miser, 1319, 1320.
- St. Peter sandstone, Ordovician, Illinois: Cady, 267, 270.
- St. Peter sandstone, Ordovician, Minnesota: Grout and Soper, 715.
- St. Peter sandstone, Ordovician, Missouri: Branson, 190; Dake, 441.
- St. Peter's sandstone, Ordovician, Indiana: Logan, 1120.
- St. Regis formation, Algonkian, Idaho: Jones, 944.
- Ste. Genevieve limestone, Mississippian, Illinois: Weller *et al.*, 1973.
- Ste. Genevieve limestone, Carboniferous, Kentucky: Jillson, 868.
- Ste. Genevieve limestone, Mississippian, Kentucky: Butts, 259; Shaw and Mather, 1680.
- Ste. Genevieve marls, Mississippian, Iowa: Lees and Thomas, 1073.
- Ste. Genevieve stage, Mississippian, Kentucky: Miller, 1293.
- Salem limestone, Mississippian, Indiana: Logan, 1120.
- Salem limestone, Mississippian, Illinois: Coryell, 410; Nebel, 1367.
- Salem limestone (Meramecian), Mississippian, Missouri: Branson, 190.
- Salina formation, Silurian, Ontario: Williams, 2034.
- Salinas shale, Miocene, California: Kew, 980.
- Salona formation, Ordovician, Pennsylvania: Field, 590.
- Salt Lake formation, Pliocene, Idaho: Mansfield, 1216.
- Salt Lake formation, Pliocene (?), Idaho: Mansfield, 1211.
- Salt Lake formation, Tertiary, Idaho: Mansfield, 1213.
- Salt Mountain limestone, Tertiary, Alabama: Brantley, 191.
- Salt Plain shale, Permian, Kansas: Snider, 1736.
- Salt Plain shale member, Permian, Kansas: Moore, 1346.
- Salt Wash sandstone member, Jurassic, Utah: Butler, 255.
- Saltzburg sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Saluda, Ordovician, Kentucky: Miller, 1293.
- Salvisa bed, Ordovician, Kentucky: Miller, 1293.
- Sample sandstone, Mississippian, Indiana: Malott, 1205.
- Sample sandstone, Mississippian, Indiana: Malott and Thompson, 1206.
- Sample sandstone member, Mississippian, Kentucky: Miller, 1293.
- Sampson Rock sandstone, Pennsylvanian, Maryland: Swartz, 1804.
- San Andreas limestone, Permian, New Mexico: Baker, 55; Semmes, 1658.

- San Angelo beds, Permian, Texas: Beede, 108.
- San Angelo formation, Permian, Texas: Beede, 109.
- San Carlos beds, Cretaceous, Texas: Udden, 1880.
- San Diego formation, Tertiary, California: Ellis, 542.
- Sandia formation, Pennsylvanian, New Mexico: Wells, 1978.
- Sandia terrane, Pennsylvanian, New Mexico: Keyes, 993.
- Sandoval terrane, Proterozoic, New Mexico: Keyes, 993.
- Sandy Huff shale, Pennsylvanian, West Virginia: Reger, 1528.
- Sangamon interglacial interval, Pleistocene: Baker, 56.
- San Juan formation, Pleistocene, Porto Rico: Maury, 1248.
- San Juan formation, Pleistocene (?), Porto Rico: Semmes, 1655.
- San Juan formation, Tertiary, Porto Rico: Berkey, 124.
- San Juan formation, Quaternary, Porto Rico: Hubbard, 877.
- San Onofre breccia, Tertiary, California: Ellis, 542.
- San Pedro formation, Quaternary, California: Ellis, 542.
- San Sebastian shale, Tertiary, Porto Rico: Hubbard, 877.
- San Sebastian shales, Tertiary, Porto Rico: Berkey, 124; Maury, 1248.
- Santa Fe terrane, Miocene, New Mexico: Keyes, 993.
- Santa Isabel series, Recent, Porto Rico: Hodge, 837.
- Santa Margarita formation, Miocene, California: Pack, 1415.
- Santa Rita series, Silurian, New Mexico: Keyes, 993.
- Sapello terrane, Archeozoic, New Mexico: Keyes, 993.
- Saranac series, pre-Cambrian, New York: Alling, 28.
- Sarbach formation, Ordovician, Alberta: Walcott, 1928.
- Sardis terrace, Tertiary, Mississippi: Lowe, 1138.
- Satilla formation, Quaternary, Georgia: McCallie, 1159.
- Satsop formation, Pleistocene, Oregon: Smith and Packard, 1728.
- Savanna formation, Pennsylvanian, Arkansas: Miser, 1319.
- Savanna limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Sawridge formation, Cretaceous, Alberta: Allan, 20.
- Scajaquada shales, Silurian, New York: Williams, 2034.
- Scanlan conglomerate, Cambrian, Arizona: Ransome, 1507.
- Schooner Head series, Mount Desert Island, Maine: Bascom, 87.
- Schultz granite, Tertiary (?), Arizona: Ransome, 1507.
- Sciotoville clay, Pennsylvanian, Ohio: Stout, 1794.
- Scranton shale, Pennsylvanian, Kansas: Snider, 1736.
- Scranton shale member, Pennsylvanian, Kansas: Moore, 1346.
- Selkirkian period, Proterozoic, New Mexico: Keyes, 993.
- Selma chalk, Cretaceous, Alabama: Brantley, 191.
- Selma chalk, Cretaceous, Gulf region: Berry, 129.
- Selma chalk, Cretaceous, Mississippi: Lowe, 1138, 1140.
- Selma clay, Cretaceous, Tennessee: Schroeder, 1623.
- Selma formation, Cretaceous, Tennessee: Wade, 1822.
- Seminole conglomerate, Pennsylvanian, Oklahoma: Snider, 1736.
- Senora formation, Pennsylvanian, Oklahoma: Snider, 1736.
- Sensori agglomerate and limestone, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Serna terrane, Archeozoic, New Mexico: Keyes, 993.
- Sespe formation, Oligocene (?), California: Kew, 979, 980.
- Seth limestone, Pennsylvanian, West Virginia: Hennen, 797.
- Seymour River limestone, Silurian, Canada: Savage and Van Tuyl, 1603.
- Severy shale, Pennsylvanian, Kansas: Snider, 1736.
- Severy shale member, Pennsylvanian, Kansas: Moore, 1346.
- Sewickley sandstone, Pennsylvanian, Ohio: Stout, 1794.
- Sextant sandstone and shale, Devonian, Canada: Savage and Van Tuyl, 1603.
- Shady dolomite, Cambrian, Virginia: Stose *et al.*, 1786.
- Shady limestone, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCallie, 1159.
- Shakopee dolomite, Ordovician, Illinois: Cady, 267.
- Shakopee dolomite, Ordovician, Minnesota: Grout and Soper, 715.
- Shammattawa limestone, Ordovician, Canada: Savage and Van Tuyl, 1603.
- Shannon (?) sandstone, Cretaceous, Wyoming: Hancock, 735.
- Sharon conglomerate, Pennsylvanian, Ohio: Stout, 1794.
- Sharon or Olean conglomerate, Pennsylvanian, Ohio, Pennsylvania, and New York: Decker, 483.
- Shawangunk conglomerate, Silurian, New York: Colony, 392.
- Shawnee formation, Pennsylvanian, Kansas: Moore, 1346; Snider, 1536.
- Sheep Creek beds, Miocene, South Dakota: O'Harra, 1389.

- Sheep Creek conglomerate, Carboniferous (?), Washington: Weaver, 1970.
- Sheffield formation, Devonian, Iowa: Fenton, 580.
- Sheppard granite, Tertiary, Washington: Weaver, 1970.
- Sherburne sandstone, Devonian, New York: Grabau, 685.
- Shellerville formation, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Shimer gypsum member, Permian, Kansas: Moore, 1346.
- Shimer gypsum, Permian, Kansas: Snider, 1736.
- Shinarump conglomerate, Triassic, Arizona: Shimer, 1693.
- Shinarump conglomerate, Triassic, Utah: Butler, 255; Clark, 344.
- Shinarump sandstone, Permian, New Mexico: Baker, 55.
- Shinarump terrane, Triassic, New Mexico: Keyes, 993.
- Shublik formation, Triassic, Alaska: Lefingwell, 1074.
- Siberia limestone, Mississippian, Indiana: Malott and Thompson, 1206.
- Sierra terrane, Mississippian, New Mexico: Keyes, 993.
- Sierra Blanca series, Cretaceous, New Mexico: Semmes, 1658.
- Sierra de Cayey series, Comanchean or Cretaceous, Porto Rico: Hodge, 837.
- Signal Hill series, pre-Cambrian, Newfoundland: Buddington, 226.
- Sillery formation, Cambrian, Quebec: Knox, 1030.
- Silver terrane, Devonian, New Mexico: Keyes, 993.
- Silver Creek member, Devonian, Kentucky: Miller, 1293.
- Silver Hoard formation, Carboniferous, British Columbia: Schofield, 1617, 1618.
- Silvies River beds, Jurassic, Oregon: Smith and Packard, 1728.
- Simpson formation, Ordovician, Oklahoma: Decker, 483.
- Skelley limestone, Pennsylvanian, Ohio: Stout, 1794.
- Skelt shale, Pennsylvanian, West Virginia: Reger, 1528.
- Skyline formation, Carboniferous, British Columbia: Schofield, 1617, 1619.
- Slocan series, Carboniferous, British Columbia: Bancroft, 66; Schofield, 1619.
- Smithwick shale, Carboniferous, Texas: Udden, 1887.
- Smithwick shale, Mississippian, Texas: Matteson, 1231.
- Smithwick shale, Pennsylvanian, Texas: Girty, 659; Girty and Moore, 660; Moore, 1344; Plummer, 1475; Snider, 1736.
- Smoky Hill chalk member, Cretaceous, Kansas: Moore, 1346.
- Smoky River formation, Cretaceous, Alberta: McLearn, 1187, 1188.
- Smoky River formation, Cretaceous, British Columbia: Stewart, 1767.
- Smoky River series, Cretaceous, British Columbia: Stewart, 1767.
- Snider Creek shale, Devonian, Missouri: Branson, 190.
- Socorran series, Mississippian, New Mexico: Keyes, 993.
- Soledad deposits, Tertiary, California: Jordan, 954.
- Solitario terrane, Archeozoic, New Mexico: Keyes, 993.
- Sooke formation, Miocene, British Columbia: Cooke, 402.
- Sooke gabbro, Oligocene, British Columbia: Cooke, 402.
- Sooke gabbro, Tertiary, British Columbia: Dolmage, 507.
- Spavinaw granite, Oklahoma: Aurin, 50.
- Spearfish formation, Triassic (?), Wyoming: Hancock, 735.
- Spence shale member, Cambrian, Idaho: Mansfield, 1211.
- Spergen, Mississippian, Kentucky: Miller, 1293.
- Spergen formation, Mississippian, Illinois: Hinds, 832.
- Spring Creek clays, Cretaceous, Kansas: Twenhofel, 1871.
- Springville shale, Devonian, Illinois: Savage, 1604.
- Squantum tillite member, Permo-Carboniferous, Massachusetts: Sayles, 1606.
- Stanley shale, Mississippian, Arkansas: Miser, 1319.
- Stanton limestone, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Stanton limestone member, Pennsylvanian, Kansas: Moore, 1346.
- Star limestone, Carboniferous, British Columbia: Schofield, 1619.
- Steele shale, Cretaceous, Wyoming: Collier, 388.
- Stensgar dolomite, Paleozoic, Washington: Weaver, 1970.
- Stevens series, Paleozoic (?), Washington: Weaver, 1970.
- Stockton (Cannelton) limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Stollmeyer Cruse shale, Tertiary, Trinidad: Macready, 1195.
- Stollmeyer oil zone, Tertiary, Trinidad: Macready, 1195.
- Stonebreaker limestone, Pennsylvanian, Oklahoma: Bowen *et al.*, 172; Heald, 779; Snider, 1736.
- Stonchenge member, Ordovician, Maryland: Bassler, 90.
- Stones River group, Ordovician, Pennsylvania: Field, 590.
- Stones River group, Ordovician, Tennessee: Galloway, 633.
- Stones River limestone, Ordovician, Maryland: Bassler, 90.

- Strawn division, Pennsylvanian, Texas: Plummer, 1475.
- Strawn formation, Pennsylvanian, Texas: Matteson, 1231; Snider, 1736.
- Stuart shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Stump sandstone, Jurassic, Idaho: Mansfield, 1214, 1216.
- Sturgeon formation, pre-Cambrian, Michigan: Allen, 25.
- Sucarnochee formation, Tertiary, Alabama: Brantley, 191.
- Sullivan formation, Cambrian, Alberta: Walcott, 1928.
- Summerfield limestone, Pennsylvanian, Ohio: Stout, 1794.
- Summit series, Idaho, Washington, and British Columbia: Weaver, 1970.
- Summitville andesite, Tertiary, Colorado: Patton, 1444.
- Sumner group, Carboniferous, Kansas: Darton, 462.
- Sunbury shale, Mississippian, Kentucky: Miller, 1293.
- Sundance formation, Jurassic, Colorado: Lee, 1067.
- Sundance formation, Jurassic, Wyoming: Collier, 389; Hancock, 735.
- Sundance marine beds, Jurassic, Colorado: Henderson, 795.
- Sunday Lake quartzite, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 865.
- Sunderland formation, Quaternary, Maryland: Hay, 767.
- Sunderland formation, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Sunloch metagabbro, Tertiary, British Columbia: Dolmage, 507.
- Supai formation, Pennsylvanian and Permian, Arizona: Shimer, 1693.
- Superioran period, Proterozoic, New Mexico: Keyes, 993.
- Sutton formation, Triassic or Jurassic, British Columbia: Dolmage, 506.
- Swan Peak quartzite, Ordovician, Idaho: Mansfield, 1211.
- Swansea rhyolite, Utah: Lindgren and Loughlin, 1105.
- Swede Pond quartzite, pre-Cambrian, New York: Alling, 28.
- Sweetland Creek shale, Devonian, Illinois: Savage, 1604.
- Sycamore limestone, Mississippian, Oklahoma: Decker, 483.
- Sylamore sandstone, Mississippian, Missouri: Branson, 190.
- Sylamore sandstone member, Devonian, Arkansas: Miser, 1319.
- Sylvan shale, Silurian, Oklahoma: Decker, 483.
- Tabera formation, Oligocene, Dominican Republic: Cooke, 400.
- Talbot formation, Quaternary, Maryland: Hay, 767.
- Talbot formation, Quaternary, Maryland, Delaware, and New Jersey: Bascom and Miller, 86.
- Tallahatta buhrstone, Tertiary, Alabama: Brantley, 191.
- Tallahatta formation, Tertiary, Mississippi: Lowe, 1138.
- Tampa formation, Oligocene, Florida: Cushman, 431; Sellards, 1647, 1648.
- Taneytown facies of Newark system, Triassic, Maryland: Dorsey, 510.
- Taosan series, Archeozoic, New Mexico: Keyes, 993.
- Tarkio formation, Carboniferous, Iowa: Smith, 1714.
- Tar Springs, Mississippian, Kentucky: Miller, 1293.
- Tar Springs formation, Mississippian, Indiana: Malott and Thompson, 1206.
- Tar Springs sandstone, Mississippian, Illinois: Weller, 1974; Weller *et al.*, 1973.
- Tatina group, Ordovician (?), Alaska: Capps, 291.
- Taylor formation, Cretaceous, Texas: Dumble, 524; Sellards, 1650, 1653; Shuler, 1696; Snider, 1736.
- Taylor marl, Cretaceous, Texas: Udden, 1880.
- Teapot Mountain porphyry, Arizona: Ransome, 1507.
- Tecovas formation, Triassic, Texas: Gould, 678.
- Tecovas terrane, Triassic, New Mexico: Keyes, 993.
- Tecuja beds, Tertiary, California: Stock, 1770.
- Tecumseh shale, Pennsylvanian, Kansas: Snider, 1736.
- Tecumseh shale member, Pennsylvanian, Kansas: Moore, 1846.
- Tejon formation, Eocene, California: Kew, 979, 980.
- Tejon formation, Eocene, California: Pack, 1415.
- Tellera terrane, Permian, New Mexico: Keyes, 993.
- Temiskaming series, pre-Cambrian, Ontario: Whitehead, 2010.
- Tensleep sandstone, Carboniferous, Wyoming: Collier, 389.
- Tensleep sandstone, Pennsylvanian, Wyoming: Schultz, 1639.
- Terry limestone, Mississippian, West Virginia: Hennen, 797; Reger, 1528.
- Tessey formation, Permo-Carboniferous, Texas: Böse, 161.
- Teutonic limestone, Cambrian, Utah: Lindgren and Loughlin, 1105; Wichman, 2024.
- Thaynes group, Triassic, Idaho: Mansfield, 1211, 1214, 1216.
- Thebes sandstone, Ordovician, Illinois and Missouri: Savage, 1602.
- Thebes sandstone, Ordovician, Missouri: Dake, 441.

- Theresa mixed beds, Cambrian, New York : Chadwick, 310.
- Thermopolis shale, Cretaceous, Wyoming : Collier, 389.
- Theftord series, post-Ordovician, Quebec : Knox, 1030.
- Thornton clay, Pennsylvanian, Ohio : Stout, 1794.
- Thornton fire clay, Pennsylvanian, West Virginia : Reger, 1528.
- Thurord sandstone member, Silurian, Ontario : Williams, 2034.
- Threeforks formation, Devonian, Montana : Condit, 395.
- Threeforks (?) limestone, Devonian, Idaho : Mansfield, 1211.
- Thurman sandstone, Pennsylvanian, Oklahoma : Snider, 1736.
- Tigre limestone, Oligocene, Panama and Costa Rica : MacDonald *et al.*, 1171.
- Tijeras terrane, Proterozoic, New Mexico : Keyes, 993.
- Timiskamian, pre-Cambrian, Ontario : Miller and Knight, 1301, 1302.
- Timiskaming series, pre-Cambrian, Canada : Cooke, 407.
- Timiskaming series, pre-Cambrian, Ontario : Burrows and Hopkins, 246.
- Timpas limestone, Cretaceous, New Mexico : Garrett, 640.
- Timpas terrane, Cretaceous, New Mexico : Keyes, 993.
- Timothy sandstone, Triassic, Idaho : Mansfield, 1211, 1214, 1216.
- Tintic quartzite, Cambrian, Utah : Lindgren and Loughlin, 1105 : Wichman, 2024.
- Tinton member, Cretaceous, New Jersey : Mansfield, 1210.
- Tionesta clay, Pennsylvanian, Ohio : Stout, 1794.
- Tionesta (Homewood) sandstone, Pennsylvanian, Ohio : Stout, 1794.
- Tippah sandstone (Crainesville of Harris), Tertiary, Mississippi : Lowe, 1138.
- Tipton shale member, Tertiary, Wyoming : Schultz, 1639.
- Todilto (?) formation, Jurassic, Utah : Clark, 344.
- Tokio sand member, Cretaceous, Arkansas : Miser, 1319.
- Toledo formation, Oligocene, Oregon : Harrison and Eaton, 761.
- Tombigbee sand, Cretaceous, Tennessee : Wade, 1922.
- Tomstown limestone, Cambrian, Maryland : Bassler, 90.
- Tonzona group, Devonian or Silurian, Alaska : Capps, 291.
- Topeka limestone, Pennsylvanian, Kansas : Snider, 1736.
- Topeka limestone member, Pennsylvanian, Kansas : Moore, 1346.
- Torbay series, pre-Cambrian, Newfoundland : Buddington, 226.
- Tornado limestone, Carboniferous, Arizona : Ransome, 1507.
- Tornillo clays, Cretaceous, Texas : Udden, 1880.
- Toro formation Miocene, Panama and Costa Rica : MacDonald *et al.*, 1171.
- Toro limestone, Pliocene, Panama, Canal Zone : MacDonald, 1170, Vaughan, 1910.
- Toronto formation, Pleistocene, Ontario : Baker, 56.
- Torpedo sandstone, Carboniferous, Oklahoma : Hopkins and Powers, 854.
- Torpedo (?) sandstone, Pennsylvanian, Oklahoma : Goldman and Robinson, 667.
- Torrance terrane, Permian, New Mexico : Keyes, 993.
- Torrejon terrane, Eocene, New Mexico : Keyes, 993.
- Totatlanika schist, Devonian or Silurian, Alaska : Capps, 291.
- Towanda bed, Permian, Kansas : Moore, 1346.
- Tow Creek sandstone, Cretaceous, Colorado : Crawford *et al.*, 416.
- Traders members, pre-Cambrian, Michigan : Allen, 25.
- Tradewater formation, Pennsylvanian, Illinois : Weller *et al.*, 1973.
- Travester terrane, Jurassic, New Mexico : Keyes, 993.
- Travis Peak sand, Cretaceous, Texas : Dumble, 524.
- Travis Peak formation, Cretaceous, Texas : Sellards, 1653 : Snider, 1736.
- Treasure Mountain latite, Tertiary, Colorado : Patton, 1454.
- Trenton group, Ordovician, Tennessee : Galloway, 633.
- Trenton limestone, Ordovician, Indiana : Logan, 1120.
- Trenton limestone, Ordovician, New York : Chadwick, 310 ; Clark, 345 ; Decker, 483.
- Trinidad formation, Cretaceous, Colorado : Henderson, 794.
- Trinidad sandstone, Cretaceous, New Mexico : Garrett, 640.
- Trinity, Cretaceous, Texas : Dumble, 524.
- Trinity conglomerate, Comanchean, Texas : Liddle and Prettyman, 1102.
- Trinity division, Comanchean, Texas : Liddle and Prettyman, 1102 ; Snider, 1736.
- Trinity division, Cretaceous, Texas : Winton and Adkins, 2062.
- Trinity formation, Cretaceous, Arkansas : Miser, 1319.
- Trinity sand, Cretaceous, Texas : Udden, 1880.
- Trinity sands, Cretaceous, Texas : Matteson, 1231.
- Trout Creek sandstone, Cretaceous, Colorado : Crawford *et al.*, 416.
- Trout Pond limestone, pre-Cambrian, New York : Alling, 28.
- Troy quartzite, Cambrian, Arizona : Ransome, 1507.
- Truchas terrane, Archeozoic, New Mexico : Keyes, 993.
- Trujillo formation, Triassic, Texas : Gould, 678.

- Trujillo terrane, Triassic, New Mexico : Keyes, 993.
- Trujillo Alta limestone, Porto Rico : Berkeley, 124.
- Tully pyrite layer, Devonian, New York : Hussakof and Bryant, 934.
- Turkey Run limestone, Pennsylvanian, Oklahoma : Bowen *et al.*, 172; Heald, 779; Heald and Mather, 780.
- Tuscaloosa formation, Tertiary, Alabama : Brantley, 191.
- Tuscaloosa formation, Cretaceous, Alabama : Brantley, 191.
- Tuscaloosa formation, Cretaceous, Alabama and Tennessee : Berry, 129.
- Tuscaloosa formation, Cretaceous, Mississippi : Lowe, 1138, 1140.
- Tuscaloosa formation, Cretaceous, Tennessee : Wade, 1922.
- Tuscumbia limestone, Mississippian, Mississippi : Lowe, 1138.
- Tusquitee quartzite, Cambrian, Georgia : McCallie, 1159.
- Twentymile sandstone, Cretaceous, Colorado : Crawford *et al.*, 416.
- Twiggs clay member, Tertiary, Georgia : McCallie, 1159.
- Twin Creek limestone, Jurassic, Idaho : Mansfield, 1216.
- Twin Creek formation, Jurassic, Wyoming : Schultz, 1639.
- Twin Creek limestone, Jurassic, Idaho : Mansfield, 1211, 1214.
- Twin Lakes porphyry, Mesozoic, Colorado : Howell, 874.
- Tyee formation, Eocene, Oregon : Harrison and Eaton, 761.
- Tyee sandstone, Eocene, Oregon : Smith and Packard, 1728.
- Tygee sandstone, Cretaceous (?), Idaho : Mansfield, 1216.
- Tyler graywacke slate, pre-Cambrian, Wisconsin and Michigan : Hotchkiss, 865.
- Tyler slate formation, pre-Cambrian, Wisconsin : Allen, 25.
- Tyner formation, Ordovician, Oklahoma : Snider, 1736.
- Tyrone substage, Ordovician, Kentucky : Miller, 1293.
- Uffington shale, Pennsylvanian, West Virginia : Reger, 1528.
- Ulsterian group, Devonian, Tennessee : Dunbar, 525.
- Ultima Thule member, Cretaceous, Arkansas : Miser, 1319.
- Umpqua formation, Eocene, Oregon : Harrison and Eaton, 761.
- Umpqua group, Eocene, Oregon : Smith and Packard, 1728.
- Unibon shale, Cretaceous (?), Porto Rico : Semmes, 1655.
- Unicoi formation, Cambrian, Virginia : Stose *et al.*, 1786.
- Uniontown limestone, Pennsylvanian, Ohio : Stout, 1794.
- University terrace, Pleistocene, Alabama : Brantley, 191.
- Ute formation, Cambrian, Idaho : Mansfield, 1211.
- Uvalde formation, Pliocene or Pleistocene, Texas : Sellards, 1653.
- Valdez group, Mesozoic (?), Alaska : Johnson, 930.
- Vale formation, Permian, Texas : Beede, 109.
- Valencian series, Proterozoic, New Mexico : Keyes, 993.
- Valentine formation, Ordovician, Pennsylvania : Field, 590.
- Valley Spring gneiss, pre-Cambrian, Texas : Snider, 1736.
- Valleytown formation, Cambrian, Georgia : McCallie, 1159.
- Valverde clay, Miocene, Dominican Republic : Cooke, 400.
- Vancouver group, Jurassic or Triassic, British Columbia : Dolmage, 506.
- Vandever shale, Pennsylvanian, Tennessee : Butts, 258.
- Vanport limestone, Pennsylvanian, Ohio : Stout, 1794.
- Vanport (ferriferous) limestone, Pennsylvanian, West Virginia : Reger, 1528.
- Vaqueros formation, Tertiary, California : Pack, 1415.
- Vaqueros sandstone, Miocene, California : Kew, 979, 980.
- Vaurial formation, Anticosti, Quebec : Twenhofel, 1873.
- Veale sand, Mississippian, Texas : Matteson, 1231.
- Vermejo formation, Cretaceous, New Mexico : Garrett, 640.
- Vermillion Cliff sandstone, Triassic, Utah : Butler, 255.
- Vermillionville sandstone, Carboniferous, Illinois : Cady, 267.
- Vicksburg formation, Oligocene, Florida : Sellards, 1647.
- Vicksburg formation, Tertiary, Florida : Sellards, 1648.
- Vicksburg formation, Tertiary, Mississippi : Lowe, 1140.
- Vicksburg group, Tertiary, Alabama : Brantley, 191.
- Vicksburg group, Tertiary, Mississippi : Lowe, 1138.
- Victoria quartzite, Mississippian, Utah : Lindgren and Loughlin, 1105.
- Vidrio formation, Permo-Carboniferous, Texas : Böse, 161.
- Vienna limestone, Mississippian, Illinois : Weller, 1974; Weller *et al.*, 1973.
- Vilas shale, Pennsylvanian, Kansas : Boughton, 170; Snider, 1736.
- Vilas shale member, Pennsylvanian, Kansas : Moore, 1346.
- Vinton, Mississippian, Ohio : Miller, 1293.
- Vinton phase of Otis limestone, Devonian, Iowa : Norton, 1381.
- Viola limestone, Ordovician, Oklahoma : Decker, 483.
- Virginia slate, pre-Cambrian, Minnesota : Grout and Broderick, 716.

- Vulcan formation, pre-Cambrian, Michigan: Allen, 25.
- Wabaunsee formation, Pennsylvanian, Kansas: Moore, 1346; Snider, 1736.
- Wabi formation, Silurian, Ontario: Hume, 931.
- Waco, Silurian, Kentucky: Miller, 1293.
- Waits River limestone, Ordovician, Vermont: Richardson, 1544, 1545.
- Walden sandstone, Carboniferous, Georgia: McCallie, 1159.
- Waldrip formation, Pennsylvanian, Texas: Plummer, 1475.
- Waldrip limestone, Pennsylvanian, Texas: Snider, 1736.
- Waldron formation, Silurian, Tennessee: Mather, 1227.
- Waldron shale, Silurian, Kentucky: Miller, 1293.
- Wallace formation, Algonkian, Idaho: Jones, 944.
- Walnut clay, Comanchean, Texas: Liddle and Prettyman, 1102.
- Walnut clays, Cretaceous, Texas: Dumble, 524; Snider, 1736.
- Walnut formation, Cretaceous, Texas: Adkins and Winton, 7.
- Walnut limestone, Cretaceous, Texas: Christner and Wheeler, 339.
- Walnut shale, Pennsylvanian, Kansas: 1736.
- Walnut shell conglomerate, Cretaceous, Texas: Winton and Adkins, 2062.
- Waltersburg sandstone, Mississippian, Illinois: Weller, 1974, 1975; Weller *et al.*, 1973.
- Wamsutta series, Carboniferous, Rhode Island: Perkins, 1462.
- Wapanucka limestone, Pennsylvanian, Oklahoma: Snider, 1736.
- Wapiti formation, Cretaceous, Alberta: McLearn, 1187.
- Wapsipinicon limestone, Devonian, Illinois and Iowa: Savage, 1604.
- Wapsipinicon stage, Devonian, Iowa: Norton, 1381.
- War Eagle (Lower) sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Warrendale formation, Miocene, Oregon: Smith and Packard, 1728.
- Warsaw formation, Mississippian, Illinois: Coryell, 410; Hinds, 832; Nebel, 1367.
- Warsaw formation, Mississippian, Kentucky: Butts, 259.
- Warsaw formation, Mississippian, Tennessee: Butts, 258; Mather, 1227.
- Warsaw limestone, Mississippian, Illinois: Weller *et al.*, 1973.
- Warsaw limestone, Mississippian, Kentucky: Miller, 1297; Shaw and Mather, 1639.
- Warsaw stage, Mississippian, Kentucky: Miller, 1293.
- Wasatch formation, Tertiary, Idaho: Mansfield, 1213, 1216.
- Wasatch formation, Tertiary, Wyoming: Schultz, 1639.
- Washington formation, Permian, Ohio: Stauffer and Schroyer, 1757; Stout, 1794.
- Washington phase of Waits River limestone: Richardson, 1544, 1545.
- Washington (Lower) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washington (Middle) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washington (Upper) limestone, Permian, Ohio: Stauffer and Schroyer, 1757.
- Washita division, Comanchean, Texas: Snider, 1736.
- Washita division, Cretaceous, Texas: Winton and Adkins, 2062.
- Washita formation, Cretaceous, Texas: Adkins and Winton, 7.
- Washita group, Cretaceous, Arkansas: Miser, 1319.
- Washita group, Cretaceous, Texas: Dumble, 524.
- Washita limestone, Cretaceous, Texas: Dumble, 524.
- Washita terrane, Comanchean, New Mexico: Keyes, 993.
- Watauga shale, Cambrian, Virginia: Stose *et al.*, 1786.
- Watsi shale, Oligocene, Panama and Costa Rica: MacDonald *et al.*, 1171.
- Wautubbe marls, Tertiary, Mississippi: Lowe, 1138.
- Waverlian series, Mississippian, Kentucky: Miller, 1293.
- Waverly group, Carboniferous, Kentucky: Jillson, 918.
- Wayan formation, Cretaceous, Idaho: Mansfield, 1216.
- Waynesboro formation, Cambrian, Maryland: Bassler, 90.
- Waynesburg limestone, Pennsylvanian, Ohio: Stout, 1794.
- Waynesburg sandstone, Permian, Ohio: Schroyer, 1757; Stout, 1794.
- Waynesville, Ordovician, Kentucky: Miller, 1293.
- Wayside sand, Pennsylvanian, Kansas: Boughton, 170.
- Webster Spring sandstone, Mississippian, West Virginia: Reger, 1528.
- Weiser sand, Pennsylvanian, Kansas: Boughton, 170.
- Weisner quartzite, Cambrian, Georgia: Hull, 880; Hull *et al.*, 878; McCallie, 1159.
- Wekusko group, pre-Cambrian, Manitoba: Alcock, 10.
- Wekusko series, pre-Cambrian, Manitoba: Alcock, 10.
- Welch sandstone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Welborn beds, Tertiary, Texas: Dumble, 524.
- Wellington formation, Permian, Kansas: Moore, 1346; Snider, 1736.

- Wells formation, Pennsylvanian, Idaho: Mansfield, 1211, 1216.
- Weno formation, Comanchean, Texas: Adkins, 6; Adkins and Winton, 7; Winton and Adkins, 2062.
- Westerville limestone, Pennsylvania, Iowa: Tilton, 1846.
- Westfield phase of Otis limestone, Devonian, Iowa: Norton, 1381.
- Weston shale, Pennsylvanian, Kansas: Boughton, 170; Snider, 1736.
- Weston shale member, Pennsylvanian, Kansas: Moore, 1346.
- West River formation, Devonian, New York: Hussakof and Bryant, 884.
- West Union formation, Silurian, Ohio: Foerste, 598, 599.
- Wetumka shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Weverton sandstone, Cambrian, Maryland: Bassler, 90.
- Wewoka shale, Pennsylvanian, Oklahoma: Snider, 1736.
- Whirlpool sandstone member, Silurian, Ontario: Williams, 2034.
- White Cliff sandstone, Jurassic, Utah: Butler, 255.
- Whiteface anorthosite, pre-Cambrian, New York: Miller, 1303, 1304.
- Whitehorse sandstone, Permian, Kansas: Snider, 1736.
- Whitehorse sandstone, Permian, Oklahoma: Clapp, 340.
- Whitehorse sandstone member, Permian, Kansas: Moore, 1346.
- White River formation, Tertiary, North Dakota: Leonard, 1082.
- White River formation, Tertiary, Wyoming: Collier, 388; Hancock, 735.
- Whiterock formation, Nova Scotia: Fari-bault, 572.
- Whitetail conglomerate, Tertiary, Arizona: Ransome, 1507.
- Wichita formation, Permian, Texas: Mat-teson, 1231.
- Wicomico formation, Quaternary, Mary-land: Hay, 767.
- Wicomico formation, Quaternary, Maryland and Delaware: Bascom and Miller, 86.
- Wilberns formation, Cambrian, Texas: Snider, 1736.
- Wilcox formation, Eocene, Texas: De Gol-yer, 485; Sellards, 1653.
- Wilcox formation, Tertiary, Georgia: Mc-Callie, 1159.
- Wilcox formation, Tertiary, Mississippi: Lowe, 1140.
- Wilcox formation, Tertiary, Texas: Dum-ble, 524; Udden, 1880.
- Wilcox group, Eocene, Texas: Snider, 1736.
- Wilcox group, Tertiary, Alabama: Brant-ley, 191.
- Wilcox group, Tertiary, Mississippi: Lowe, 1138.
- White slate, Algonkian, Georgia: Hull, 930.
- Willard shale, Pennsylvanian, Kansas: Snider, 1736.
- Willard shale member, Pennsylvanian, Kan-sas: Moore, 1346.
- Williamson sandstone, Pennsylvanian, West Virginia: Hennen, 797.
- Williamson shale member, Silurian, On-tario: Williams, 2034.
- Williamsville bed, Silurian, New York: Williams, 2034.
- Willow Creek beds, Tertiary, Alberta: Slip-per, 1712.
- Willow Creek formation, Eocene, Alberta: Stewart, 1766.
- Wilson formation, Pennsylvanian, Okla-homa: Snider, 1736.
- Wind River formation, Tertiary, Wyoming: Collier, 388, 389.
- Windrow formation, upper Mississippi Val-ley: Thwaites and Twenhofel, 1843.
- Windsor series, Mississippian, Nova Scotia: Hayes, 772.
- Winfield limestone, Permian, Kansas: Sni-der, 1736.
- Winfield limestone, Permian, Oklahoma: Bowen *et al.*, 172.
- Winfield limestone member, Permian, Kan-sas: Moore, 1346.
- Wingate sandstone, Jurassic, New Mexico: Lee, 1068.
- Wingate sandstone, Jurassic, Utah: Clark, 344.
- Wingate terrane, Triassic, New Mexico: Keyes, 993.
- Winifrede limestone, Pennsylvanian, West Virginia: Hennen, 797; Reger, 1528.
- Winifrede (Lower) sandstone, Pennsylvan-ian, West Virginia: Hennen, 797; Reger, 1528.
- Winifrede (Upper) sandstone, Pennsylvan-ian, West Virginia: Hennen, 797; Reger, 1528.
- Winona sand, Tertiary, Mississippi: Lowe, 1138.
- Winslow formation, Pennsylvanian, Arkan-sas: Miser, 1319.
- Winslow formation, Pennsylvanian, Okla-homa: Bloesch, 155.
- Winterset limestone, Pennsylvanian, Iowa: Tilton, 1846.
- Winterset limestone, Pennsylvanian, Kan-sas: Snider, 1736.
- Winterset limestone member, Pennsylvan-ian, Kansas: Moore, 1346.
- Wisconsin drift, Pleistocene: Baker, 56.
- Wisconsin drift, Pleistocene, Minnesota: Sardeson, 1600.
- Wisconsin glacial stage, Quaternary, Ohio: Stout, 1794.
- Wissahickon mica gneiss, pre-Cambrian, Maryland and Pennsylvania: Bascom and Miller, 86.
- Wolfcamp formation, Permo-Carboniferous, Texas: Böse, 161.
- Womble shale, Ordovician, Arkansas: Miser, 1319.

- Wood shale, Triassic (?), Idaho: Mansfield, 1211, 1214, 1216.
- Woodbine formation, Cretaceous, Texas: Dumble, 524; Shuler, 1696; Snider, 1736; Udden, 1880; Winton and Adkins, 2062.
- Woodburn bed, Ordovician, Kentucky: Miller, 1293.
- Woodford chert, Devonian, Oklahoma: Decker, 483.
- Wood's Bluff formation, Tertiary, Mississippi: Lowe, 1138.
- Woodside shale, Triassic, Idaho: Mansfield, 1211, 1214, 1216.
- Woodward formation, Permian, Kansas: Moore, 1346; Snider, 1736.
- Word formation, Carboniferous, Texas: Beede, 111.
- Word formation, Permo-Carboniferous, Texas: Böse, 161.
- Wreck Bay formation, Pleistocene (?), British Columbia: Dolmage, 506.
- Wreford limestone, Permian, Kansas and Oklahoma: Snider, 1736.
- Wreford limestone, Permian, Oklahoma: Bowman *et al.*, 172.
- Wreford limestone member, Carboniferous, Kansas and Oklahoma: Twenhofel, 1867.
- Wreford limestone member, Permian, Kansas: Moore, 1346.
- Wynona sandstone, Pennsylvanian, Oklahoma: Heald and Bowen, 778.
- Yale member, pre-Cambrian, Wisconsin and Michigan: Hotchkiss, 915.
- Yankeetown chert, Mississippian, Illinois: Weller, 1974.
- Yaque group, Miocene, Dominican Republic: Cooke, 400.
- Yaquina formation, Oligocene, Oregon: Harrison and Eaton, 761.
- Yarmouth (?) sand and soil, Pleistocene, Illinois: Hinds, 832.
- Yarmouth stage, Pleistocene, Iowa: Tilton, 1846, 1847.
- Yarmouth interglacial interval, Pleistocene: Baker, 56.
- Yazoo clays, Tertiary, Mississippi: Lowe, 1138.
- Yegua clay, Tertiary, Texas: Udden, 1880.
- Yegua formation, Eocene, Texas: Snider, 1736.
- Yegua formation, Tertiary, Texas: Dumble, 524.
- Yellow Creek beds, Devonian, Mississippi: Lowe, 1138.
- Yeso formation, Pennsylvanian, New Mexico, Semmes, 1658.
- Yeso formation, Permian, New Mexico: Baker, 55.
- Yeso terrane, Permian, New Mexico: Keyes, 993.
- Ysidro terrane, Proterozoic, New Mexico: Keyes, 993.
- Zoar (Lower Mercer) limestone, Pennsylvanian, Ohio: Stout, 1794.
- Zunian series, Jurassic, New Mexico: Keyes, 993.



